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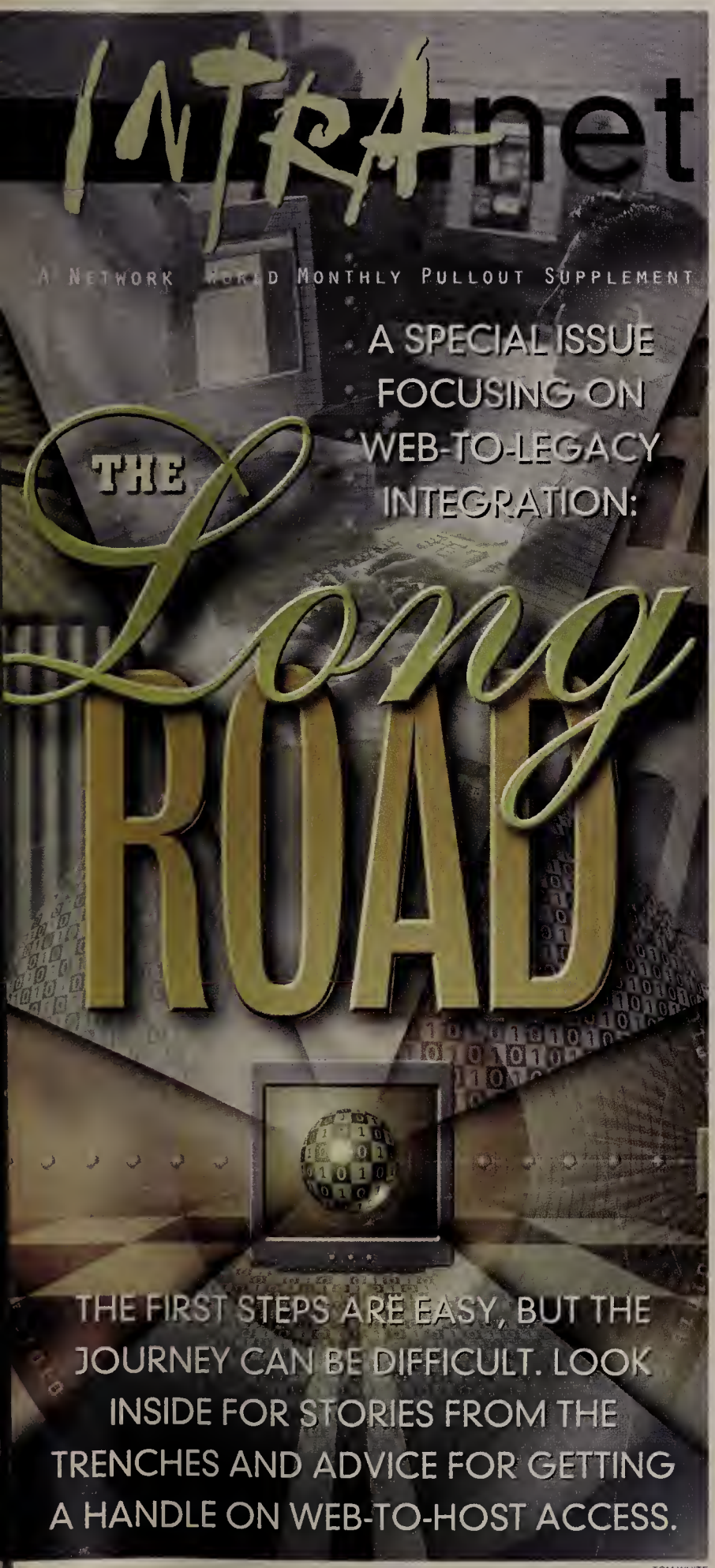
OCTOBER 26, 1998 VOLUME 15, NUMBER 43

NetworkWorld

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING



TOM WHITE

Frame relay all the rage at N+I

New services keep frame relay pumping, give users a taste of convergence.

By David Rohde, Tim Greene and Denise Pappalardo
Atlanta

NetWorld+Interop 98 here last week was abuzz with talk about the potential of converging voice and data over IP.

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Separately, Equant Network Services unveiled an offering that lets customers make intracompany voice calls over their frame relay networks. Also at the show, GTE debuted frame relay management services.

See **Frame relay,** *page 70*

HotJava rearmed for browser war

By Chris Nerney

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"We're getting back into the browser market," says Jonathan Schwartz, director of enterprise products for Sun's Java Software division.

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HotJava product manager Scott Ryder declined to talk

See **HotJava,** *page 69*

OpenView digs into SANs

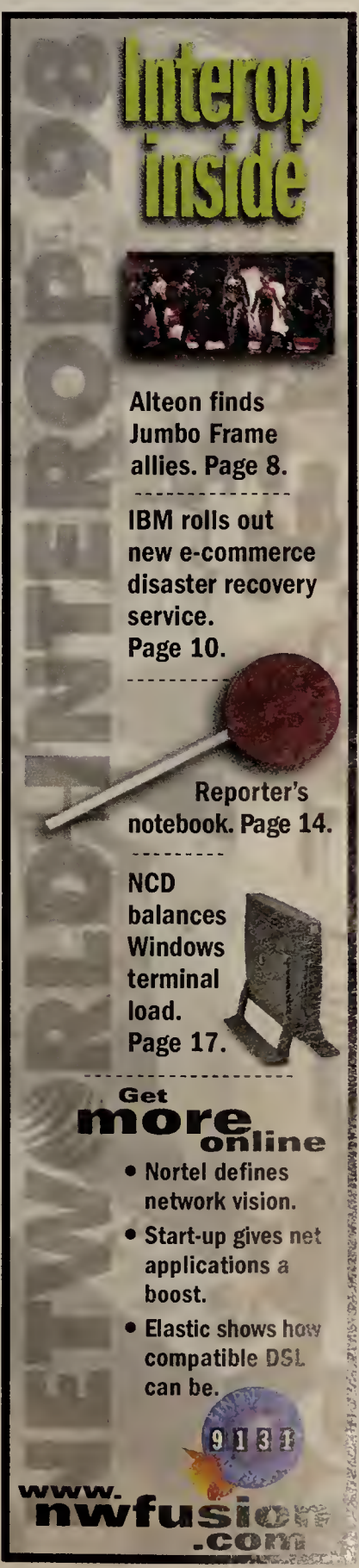
By Marc Songini and Robin Schreier Hohman

Hewlett-Packard wants to help users manage storage-area networks the same way they manage the rest of their enterprise.

This week HP is expected to announce SAN management applications that will give users the ability to monitor storage devices and assign storage priority to users — via HP's OpenView management package.

A SAN is a high-speed network of storage devices, usually

See **SAN,** *page 69*



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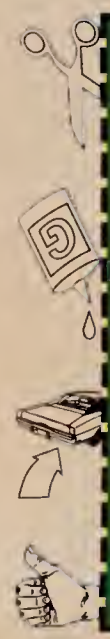

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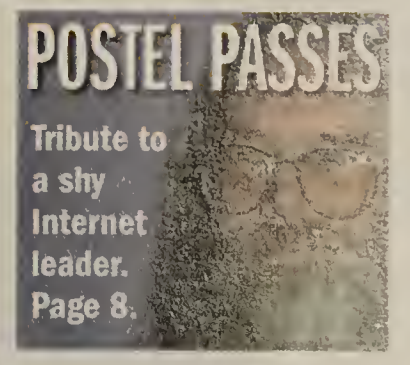

All guns on Cisco at switching showdown

By Jim Duffy
Atlanta

You can't blame Cisco for being defensive.

After all, everyone wanted a piece of the internetworking giant at the Network World Layer 3 Switching Showdown during last week's NetWorld+ Interop 98 here.

The showdown, the sixth such presidential-style debate *Network World* has hosted at major trade shows, separated some of the fact from fiction regarding Layer 3 switches.

In addition to Cisco, 3Com, Cabletron, Extreme Networks, Foundry Networks, Nortel Networks and Packet Engines participated.


JEFF GARTIN

Cisco's Jayshree Ullal: *On the hot seat at the Layer 3 showdown.*

The vendors fired pointed questions at each other and responded to questions from a

See **Showdown,** *page 71*

Companies risk getting crushed by all those messages if they don't devise strategies for handling the burden.

By Kimberly Patch and Eric Smalley

Does it take you at least a day to slog through your e-mail in-box when you return from vacation? You can expect the onerous chore to get even worse.

E-mail usage has skyrocketed, with message volumes doubling in each of the past several years at many organizations. There's no end in sight as more people use e-mail for business-to-business, business-to-customer and personal communications. Even the size of the typical message has grown.

And when the floodgates of electronic commerce open wide, the deluge of e-mail will get even heavier as legitimate direct marketers elbow their way past the scam artists and pornographers who pioneered spam.

See **E-mail overload,** *page 45*

Crystal Henner, *director of enterprise service delivery management at Merrill Lynch, says the firm's e-mail load doubles every year.*

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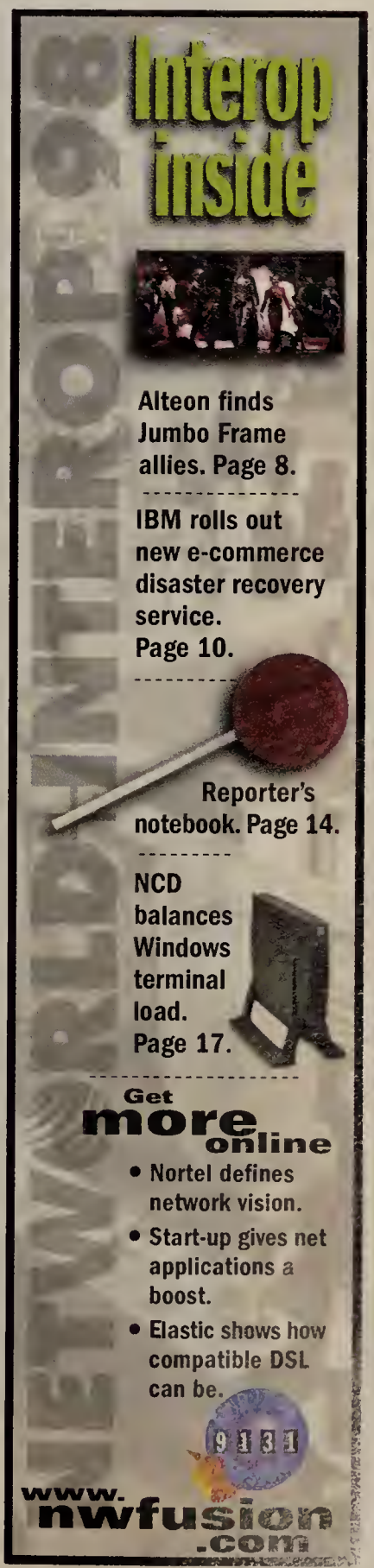

JEFF GARTIN


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SAFEGUARDING EVIDENCE

Take the right steps to preserve a cybercriminal's electronic fingerprints without ruining your case. Page 54.

THE STOCK ILLUSTRATION SOURCE

BALANCING ACT

New software for Network Computing Devices' ThinStar Windows terminals and servers helps balance traffic flow in busy thin-client environments. Page 17.

COST CONTROL

Keane consultancy Chief Information Officer Dave Dengler wanted to dramatically cut remote access costs, so he turned to Indus River for a VPN package. Page 23.

SHAWN HENRY

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SHAWN HENRY

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This Week

Only on Fusion

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Spotlight Series: How are you going to survive the IT labor shortage? Hop online to ask EDP Staffing's Shaun Kelly what you can do to shore up your department and keep employees satisfied. He'll be online all week to field your questions. **DocFinder: 9130**

NetWorld+Interop 98: You want Interop news? We got Interop news. If you missed last week's show, head online for all the latest product rollouts, announcements and keynotes straight from Atlanta. **DocFinder: 9131**

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News briefs, October 26, 1998

Congress does what it's elected to do

It seems Congress sometimes really does have better things to do than track the activities of White House interns. Several technology-related proposals were tacked on to the huge federal budget bill, which was signed into law by President Clinton just before the legislative session ended. Here's a sampling of industry-related items that will take effect in 30 days:

- The American Competitiveness Act temporarily increases the number of foreign technology worker permits, called H-1B visas. For the next two years, 115,000 such visas will be permitted rather than the 65,000 allowed previously. In 2001, the number of H-1B visas drops to 107,500, and will return to 65,000 in 2002.
- The Digital Millennium Act's basic intent is to implement World Intellectual Property Organization treaties related to copyrights of digitally transmitted and stored material. The act makes it a criminal offense to circumvent copyright protection measures and forbids the manufacture, import, distribution or sale of devices or services that could circumvent copyrights.
- The Internet Tax Freedom Act prohibits new Internet taxes for three years. The act also calls for a commission to review options for taxing online commerce.

In banking we trust

Eight major banks last week formed a trust company to develop a global businesses standard for secure electronic commerce. The participating banks — ABN AMRO Bank NV, Bank of America, Bankers Trust, Barclays Bank, Chase Manhattan, Citibank, Deutsche Bank AG and Hypo Vereinsbank AG — will issue digital certificates to end users. Businesses can use the certificates to identify users for Internet transactions. The certificates guarantee the identities of the parties involved and will save users the trouble of having to set up different digital certificates with each business.

Mind your own beeswax

IBM last week announced a new privacy consulting service, offered in partnership with the Privacy Consulting Group (PCG). IBM and PCG will work with customers to create, assess and monitor their information privacy policies and procedures.

IBM and PCG will also show companies what privacy statements they can include on their Web sites — and what underlying policies they can adopt — to allay customer concerns about privacy. While the service will help your privacy concerns, it won't help your wallet: Consulting service charges run from $25,000 to $100,000.

DSL gets lite

The International Telecommunication Union last week officially blessed the G.Lite Asymmetric Digital Subscriber Line standard. The G.Lite standard is expected to accelerate the rollout of high-speed Internet access to customers over existing telephone lines. DSL-Lite supports 1.5M bit/sec downloads and 500K bit/sec uploads. Final ratification of the G.Lite standard is anticipated at an ITU meeting in June 1999, but this vote provides the specifications manufacturers and service providers need in order to begin bringing compatible products to market. A number of leading vendors backed the DSL-Lite specification, including Intel, Compaq, Microsoft, Ameritech, Bell Atlantic, BellSouth, British Telecommunications, Deutsche Telecom, France Telecom, GTE, MCI WorldCom, NTT, SBC Communications, Singapore Tel, Sprint and US WEST.

Jumping on the NDS bandwagon

Tivoli could be the next big player to back Novell directory.

By Christine Burns

Novell is polishing its Novell Directory Services (NDS) crown jewel with new utilities and a panoply of third-party partners.

In interviews last week, Novell officials hinted at a pending deal that would bring systems management platform vendor Tivoli Systems into the NDS fold.

"Imagine how much easier systems management would be if there was one central place where information about all devices, all system alerts and all management agents was stored," explains Chris Stone, vice president of strategic relationships for Novell.

While Stone refused to confirm that a Tivoli deal was in the works, sources close to both companies say just such a partnership will be revealed in the coming weeks.

It is unclear whether Tivoli will adopt NDS as a central store or merely provide tighter hooks to its own management data repository.

Unfortunately, Novell is not having as much luck getting Tivoli rival Computer Associates (CA) to adopt NDS as its central store. CA has talked to Novell about how CA's Unicenter management platform can "better leverage" NDS, says Yogesh Gupta, CA vice president of marketing. But the conversation ended there. "I have to have my own repository. I can't tell my customers they have to use NDS," Gupta says.

In other news, Novell CEO Eric Schmidt revealed that his company is working on several new directory-enabled technologies including: a client-side directory service that holds users' personal preferences; a security certificate revocation application; software licensing wares; and a set of directory-enabled document management tools, which support the Extensible Markup Language standard for publishing Web-based data.

JEFF GARTIN

Novell's Schmidt *says new directory-enabled technologies are on the way.*

Other partners

Tivoli is not the only NDS dance partner. Novell last week announced that Lucent will bundle and integrate NDS with its CajunRules policy management software currently shipping with the Cajun P550 Switch Gigabit Ethernet product.

This integration will allow administrators to use Novell's directory administration tool, NWAdmin, to define user and application access to network services delivered by Cajun 550 switches.

For example, an administrator can ensure that the company CEO gets guaranteed bandwidth service from all Cajun switches regardless of where the CEO is logged on to the network.

Likewise, an administrator can use NDS to dictate that videoconferencing applications run exclusively over dedicated pipes and do not affect the quality of other networked services.

This policy-based functionality is scheduled to be available over the next 12 to 18 months for the other members of Lucent's Cajun Campus product line, as well as for other offerings in the company's data network enterprise portfolio.

Novell has been scrambling to get a network hardware vendor to board the NDS train since 18 months ago when Cisco selected Microsoft's yet-to-be released NT 5.0 Active Directory as the store it would use to manage its switches and routers. Cisco says it won't support NDS natively but will support it peripherally through standards.

While his Washington, D.C. financial institution spends upwards of $1 million on Cisco hardware, network analyst Tom Ferris says the NDS integration could warrant a second look at Lucent products.

"We've never had much of a relationship with Lucent in the past, but I think we'll have them in to discuss this strategy," says Ferris, who manages 60 Novell servers and 3,500 NDS users.

This type of integration is no surprise to some observers. NDS' extensible schema has always allowed customers to expand the directory to accommodate whatever users wanted, says Travis Berkley, supervisor of LAN support services at the University of Kansas.

Network World *Senior Editor Jeff Caruso contributed to this story.*

On one hand, your server operating system is about keeping the network up and running.

There is, however, the other hand.

Microsoft® Windows NT® Server 4.0 runs both your network and your business applications. This is an important distinction.

It means you won't spend your days figuring out how to cobble together business solutions, because more parts of your network will be tightly integrated. It means your network can do more now, do it more efficiently, and give you fewer headaches over what the future holds. It means Windows NT Server is a true multipurpose server operating system.

It all starts with great file and print. (In fact, Windows NT Server 4.0 is a 25% faster file server than NetWare 5.) Then, when you're ready, it lets you take advantage of the latest network functions.

What this really means for you is a solid foundation, and the freedom to grow into whatever you need down the line.

Internet guru leaves legacy

Jon Postel passes, praised for his many accomplishments.

By Sandra Gittlen

In recent months, Jon Postel became known for his controversial plan to privatize the world's Internet address and numbering system. But when he died this month, friends and colleagues quickly put aside any conflicts to highlight his numerous contributions to the Internet (see column, page 38).

Postel, who was in charge of doling out IP names, numbers and ports, passed away Oct. 16 of complications from heart surgery. One of the founding fathers of the Internet, Postel, with his long, white beard, looked like a cross between Father Time and Santa Claus.

He was one of the early researchers on the government's Advanced Research Projects Agency Network (ARPAnet), the precursor to the Internet, and applied his pioneering attitude to all his projects. Sometimes, this go-it-alone spirit got him into trouble and thrust the attention-shy engineer into the public eye.

Earlier this year, Postel redirected the world's root servers to accept Internet address updates from his computer to test how easily the system could be transitioned to the private sector.

What he called a test of the government's domain name revamping plan was labeled a hostile move by some. Postel, at a recent Internet Engineering Task Force (IETF) meeting, says he didn't understand why people were so quick to attack him.

Tony Rutkowski, former president of the Internet Society, says it was a shame that Postel was so haunted over the past year by the press and critics over the Internet address incident because Postel's contributions to the Internet were greater than any friction caused by the recent dispute.

"He came to find himself . . . in the eye of the hurricane," Rutkowski says. "In the face of it all, he was still just a quiet, gentle, reflective person."

Bob Braden, who worked at the Information Sciences Institute with Postel, says Postel's accomplishments were too great to count, reaching back to the early days of the Internet.

"He was the floor manager for the switchover from the ARPAnet to the Internet," he says. He transitioned the research network, which relied on host-to-host protocols, to a commercial network that used Internet protocols. He was also a co-author of IP Version 4 and the administrator of the .us domain.

But colleagues point to the IETF's requests for comment process he developed and led as his strongest contribution to the Internet.

A meticulous editor, Postel pored over all the standards. "He has looked at every word of every document," Braden says. "If it wasn't clear, he'd send it back to the author."

"I called him 'the clerk of the Internet,'" says Brian Carpenter, head of the IETF's Internet Architecture Board. "He detected mistakes that were going to go into protocol designs; he had the breadth of knowledge to be able to do this."

Carpenter says one of Postel's greatest traits was "the ability to not overreact when people got ridiculous. He always seemed to keep his cool." ■

JON POSTEL'S MILESTONES

- **1943:** Born
- **1968:** Begins assigning IP names and numbers
- **1969:** Writes and edits the first requests for comment
- **1974:** Graduates from UCLA with a PhD. in computer science
- **1977:** Joins USC's Information Sciences Institute
- **1978:** Develops TCP/IP with Vint Cerf and Danny Cohen
- **1988:** Officially becomes the Internet Assigned Numbers authority
- **1998:** Wins ITU's Silver Medal
  - Submits final proposal for new IP name and number assignment corporation to Clinton administration
  - Dies October 16

Microsoft to ship reliable version of NT 4.0

By Christine Burns
Atlanta

If you want to secure a dependable version of Windows NT 4.0, Microsoft officials say you should deploy the company's latest service pack.

Answering user calls for a hardier NT 4.0 upgrade, NT program manager Ed Muth says the NT 4.0 Service Pack 4 (SP4), released last week, is "the most reliable and functional version of NT we've ever delivered to the marketplace."

Muth explains that during the 18-month development cycle for SP4, Microsoft ran tests on 2,000 NT machines to determine what aspects of the system software were causing the servers to crash. Microsoft discovered lingering problems with memory leaks and device drivers, and with the interaction between antivirus software and the operating system.

"We compiled a terabyte of data on why NT 4.0 wasn't reliable, and we focused on fixing the guts of the product to help users get as close to 100% uptime as possible," Muth says.

In addition to providing patches to remedy NT 4.0's poor reliability reputation, Microsoft has included in SP4 a set of tools — such as kernel debugging extensions and a kernel memory space analyzer — to help administrators diagnose and analyze system problems.

Users were pleased that Microsoft has focused on reliability issues with SP4, pointing to Microsoft's track record for delivering service pack software that is buggy and causes many NT servers to crash as a result.

"I was burnt by SP2, which precipitated more blue screens than I care to remember," says Andy Drooker, director of technology and infrastructure at Turner Broadcasting Sales here. "I trust that with all the testing they have done with SP4, they are not going to do that to us again."

Drooker says he will roll out SP4 to all of his organization's 150 NT 4.0 servers.

SP4 includes Year 2000 patches, fixes for several NT 4.0 Option Pack components, including Microsoft Transaction Server, Microsoft Message Queue Server, Internet Information Server 4.0, Certificate Server, and Point-to-Point Tunneling Protocol performance. SP4 is available free from Microsoft's Web site. ■

SERVICE PACK PROGRESS

Bugs fixed from previous NT 4.0 service packs

Service Pack 1, December '96

- Fixed sporadic data corruption in memory.
- Stopped "Out of Memory" errors on Microsoft's Internet Information Server.
- Corrected a bug that moved rather than copied compressed files on NTFS partitions from a PC.

Service Pack 2, January '97

- Fixed the DHCP server feature that was giving out the same IP address to multiple clients.
- Corrected a failure of the directory to replicate data to all servers.
- Included a graphical uninstall program that let users roll back any bug fix.

Service Pack 3, released May '97

- Fixed bug that allowed hackers to access registry information on NT 4.0 Web servers.
- Improved password filtering capabilities.

SOURCE: IDG NEWS SERVICE, BOSTON, MASS.

Vendors back Jumbo Frames

By Jeff Caruso
Atlanta

Alteon Networks continued its crusade for Jumbo Frames last week, winning endorsements from FORE Systems, IBM, Microsoft, Silicon Graphics and other companies.

NETWORLD+INTEROP 98

At NetWorld+Interop 98, Alteon also announced it has developed a way to make the proprietary Jumbo Frames technology transparent to networks that don't support the big frames. Next year the company plans to have products that support the new technique.

Until now, Alteon has largely been on its own in developing Jumbo Frames. By extending the Ethernet frame size from 1,500 to 9,000 bytes, Alteon says it can get higher throughput from servers using Gigabit Ethernet. Servers don't have to work as hard because they are sending or receiving fewer frames during any given period of time, and therefore, have fewer frames to process.

But critics have pointed out that most users won't accept Jumbo Frames unless they are standardized by the IEEE.

Alteon is trying to address that issue by petitioning the IEEE to form a study group to look into the possibility of standardizing Jumbo Frames. The company is also working to make the technology play better in standard Ethernet networks.

To do this, Alteon server network interface cards will break large frames into 1,500-byte chunks, which can then be sent across existing Ethernet nets. The technology eliminates the need for Alteon switches, which would be needed to process Jumbo Frames.

FORE says it will include support for Jumbo Frames in the switches it recently acquired along with Berkeley Networks. IBM is including support now in adapters for its RS/6000 workstations and will add support to mainframe systems in the first quarter of next year. And Silicon Graphics will bundle drivers for Jumbo Frames with its Irix operating system next year. ■

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Let's say you've got the basics handled, then the CEO decides you need a complete communications solution. From server-based messaging to a Virtual Private Network, your solution will cross the line between your applications platform and your network OS. Microsoft® Windows NT® Server's unique multipurpose design will handle the crossover.

And if someone decides your future is e-commerce, or you simply decide to build an intranet, you won't need an army of coders and system managers to get you there. Why? Because multipurpose means that Web services, application services, security and management are integrated—they all work together.

So, when you choose Windows NT Server, you prepare yourself for the changing needs of today's networks.

IBM sells Web disaster insurance

Agreement with MCI and AT&T allows for the redirection of IP traffic in the event of server failure.

By Ellen Messmer

MIS managers have long bought disaster recovery services for critical mainframe applications. But what happens if your now-essential electronic commerce Web server goes up in flames?

You'll need complete backup and recovery or your site is out of business.

Facing this challenge, IBM, the pioneer of mainframe disaster recovery, has also come up with a set of services to protect Internet applications. As part of its effort, IBM has gotten AT&T and MCI, along with its own IBM Global Services, to cooperate in rerouting IP traffic to a backup site so electronic commerce can continue during a crisis.

"With these ISPs, we've developed a way to redirect traffic in the event of a disaster, such as a building burning down," explains Michael Solter, IBM's manager for business recovery services, adding that he hopes to see similar arrangements with other ISPs.

"Through coordination with the ISP, we advertise the customer's address space so Internet traffic is redirected to the IBM 'hot site,' " Solter says. At these disaster recovery hot sites, such as the ones in Sterling Forest, N.Y., and Boulder, Colo., duplicates of the customer's electronic commerce servers and databases are maintained and updated 24-7.

Publisher John Wiley & Sons has used IBM's disaster recovery services for years for its internal network of AS/400 systems. Earlier this year, the company turned to IBM for Web server backup because the company plans to sell publications online, some in digital format.

NETWORLD+INTEROP 98

"With the introduction of the Internet for electronic commerce, and the growing importance of it, Wiley felt it was necessary to take steps to protect Internet computing at the same level it protects corporate computing," says Michael Silverstein, director of technology services.

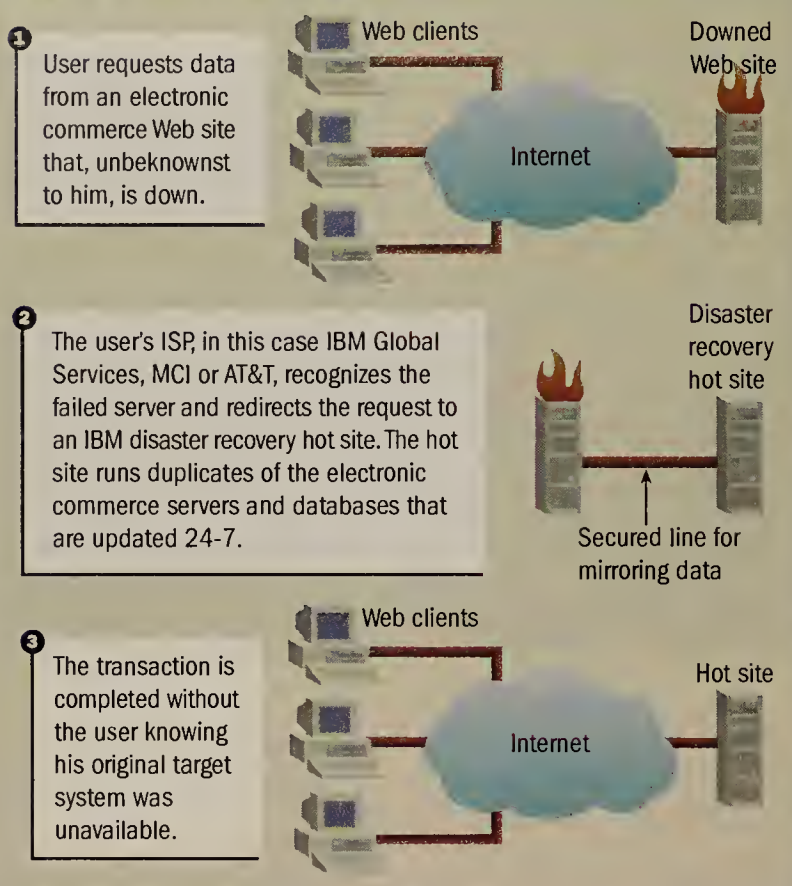
In Somerset, N.J., Wiley hosts its own server farm that's primarily based on Netscape's Web server software running on the Sun Enterprise Services platform. But with large-scale online book-selling operations expected to start by year-end, Wiley wanted an Internet disaster recovery service so customers could order publications even if its New Jersey data center suffered a wipeout.

"We've tested this backup and it works," says Silverstein of the IBM electronic commerce disaster recovery service.

IBM says it has readied a portfolio of options for its electronic-business disaster recovery services. The options range from server mirroring services from $660 per month per server pair if the customer hosts its own backup server to $2,200 per month if the customer server is housed at IBM's site. ■

Up in flames, but still registering hits

How IBM recovery support services for electronic business works:



Lotus helps ERP play with Domino

By Paul McNamara

Cambridge, Mass.

Building on a theme that has dominated its Domino sales pitch lately, Lotus this week and next will unveil a pair of additional ERP connectors for its flagship Web application server.

Domino Connector for Oracle Applications will debut this week at the Oracle Applications User Group meeting in Honolulu. Domino Connector for PeopleSoft will follow suit at the PeopleSoft Conference 1998, which opens next Monday in San Francisco.

With the new and existing Connectors for applications from leading enterprise resource planning (ERP) vendor SAP and a number of smaller companies, Domino will be accessible to more than 50% of the ERP market, Lotus claims.

Combining Domino and ERP applications will allow companies to offer more employees Web-based access to self-service applications in areas such as human resources, according to Lotus. The company also is touting the combination as ideal for supply-chain management.

The Domino-to-ERP connectors let customers combine the collaboration, workflow and replication capabilities of Domino with back-end ERP data and enterprise applications. A common object model used in the various Lotus connectors allows customers to easily link Domino to multiple ERP applications, as well as relational database management and transaction systems, Lotus says. The Domino Connector Tool Kit can be used by third-party vendors to connect any ERP applications that Lotus does not currently cover to Domino.

With the Notes/Domino installed base of over 20 million users, and corporate appetites for ERP applications such as SAP and PeopleSoft growing rapidly, Lotus has a golden opportunity to tie the two realms together, according to Mark Gilbert, a senior research analyst with Gartner Group.

"These are the giant applications out there in corporate America, and actually, the world," Gilbert says.

The new Domino Connectors to PeopleSoft and Oracle are expected to ship in the first quarter of next year. Pricing has not been announced.

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Shakeout hits the voice mail market

Challenges in unified messaging, platforms and channels lead to consolidation, financial pressure.

By David Rohde
Seattle

They're both in the Seattle area. They've both courted Microsoft. They've both integrated their products with the software giant's messaging and groupware platforms.

And they've both battled fear, uncertainty and doubt from major PBX vendors, which say bigger is better when it's time to buy all your telecom systems.

But that's where the similarities end between AVT and Active Voice — practically the last two independent voice messaging vendors left standing in a once vibrant market.

AVT has been posting healthy growth in revenue and profits. But Active Voice has seen its stock sink under the weight of stalled revenue, increased research and development costs and quarterly losses.

The diverging fortunes of AVT and Active Voice illustrate the trials and tribulations of today's voice mail market. It's a field in which companies have struggled for years to capture the imagination of IS managers with unified messaging systems. Increasingly dominant PBX vendors have thinned out the voice mail market.

In mid-1997, PBX behemoth Lucent acquired the biggest independent voice-mail company, Octel Communications, as much for Octel's strength in carrier voice mail systems as for its large enterprise base. And earlier this year, Centigram Communications, facing a drop in enterprise voice messaging and unified-messaging sales, sold its enterprise business to No. 5 PBX vendor Mitel to concentrate on the carrier market.

AVT's CallExpress for OS/2 and Windows NT and Active Voice's Repartee pop e-mail, fax and voice mail headers into a unified client interface. But the failure of users to vote with their dollars for these kinds of systems is the biggest of several reasons why users now face increasingly few choices in the unglamorous but essential field of voice messaging, analysts say.

What's going on? "People are not jumping up and saying, 'I'm going to throw out my voice mail system for unified messaging,' " says Jim Burton, president of C-T Link, a St. Helena, Calif., consulting firm that specializes in computer-telephone integration (CTI). And if people do, he adds, "they're not going to pay a lot of extra money for it."

AVT Senior Vice President Joe Staples *says no one is beating down the unified messaging door.*

Diversify to survive

"Nobody's beating down the door saying, 'I want to implement unified messaging right now,' " agrees Joe Staples, AVT's senior vice president of worldwide marketing. To score its recent financial success, the firm had to diversify into some related fields. In fact, just this past summer the company changed its name from Applied Voice Technologies to AVT to emphasize that it's more than just a voice vendor.

In 1996, AVT acquired RightFax, which produces LAN servers that let users send desktop fax messaging. That business is growing 80% to 100% per year, Staples says, compared with voice mail's snail-like single-digit growth. Last year, AVT bought Telcom Technologies, which makes a Windows NT automatic call distributor, tapping the burgeoning market for small customer service call centers.

"The return on investment on fax is very easy to justify," Staples says. But the RightFax acquisition gave AVT an even more important long-term benefit: a set of value-added resellers (VAR) from the data world. Most voice mail vendors have tried to sell unified messaging through the PBX industry's network of independent dealers known as interconnects — with limited success.

"There wasn't a readily available channel that said, 'I understand the telecom world, and I understand the LAN/IT side,' " Staples says. Now the RightFax VAR channel is available to sell both products. "A lot of RightFax VARs will lead with fax and follow up with voice," Staples says.

Still, many users have had to do lots of their own upfront work to get the systems installed. For example, Marlyn Piper-Williams, telecommunications specialist at the U.S. Department of Health and Human Services, has had difficulty finding qualified dealers who know the voice and data worlds to install AVT's Call-Express at three agency locations.

"That's been one of our problems," Piper-Williams says. "The dealership thing has driven me crazy." But she says the system has been a boon for the agency because so much of the its work depends on faxes. "There's a lot of fax machines all over the department," she says. "And there are a lot of confidential faxes that shouldn't be sent over the public fax machines."

With CallExpress' Desktop Message Manager client software, end users can also organize their faxes into folders and other e-mail-like features.

Some skeptics say AVT's strategy doesn't buy the company much for the long term.

"AVT has made some very astute acquisitions, and it's pumped their stock price up," says Frank Costa, president of Active Voice. "But I question whether there's been a lot of cross value between the acquisitions. They've moved from being a voice mail company to primarily a fax company, and their fax channel has been completely unsuccessful at selling CallExpress."

C-T Link's Burton agrees that finding a VAR that can install a LAN, an advanced fax package and unified messaging at the same time is still a challenge. "These companies are having a very hard time training the channels," Burton says. "Putting a fax board into a server is very different than putting in a unified messaging product."

Still, Active Voice's Costa concedes that without the fax and other revenue that AVT enjoys, Active Voice's short-term financial performance has suffered. Active Voice posted a loss of 22 cents per share in the second quarter of this year. The company's Repartee unified messaging system has obtained a base of smaller users, and in a recent filing with the Securities and Exchange Commission, the company conceded that fact is hurting profit margins.

By contrast, AVT has avoided going after the small fry. "We have very distinctly stayed out of the low end of the market," AVT's Staples says. "The PBX makers are going to give away four-port and six-port voice mail systems not to lose a switch sale. So we said, 'Let's do things big switch makers don't do well.' "

Active Voice's Costa says his company will accept the short-term losses while the firm invests in a new unified messaging platform. The product, called Unity, is a "ground-up redesign" that employs Lightweight Directory Access Protocol to pop the voice mail message into a Microsoft Exchange or other groupware mailbox. Typical unified messaging systems house voice and fax messages on a separate server and provide a client-side integration of all three message types.

"We're out of the directory and database business entirely," Costa says. The latest version of AVT's CallExpressNT, also stores voice and fax messages directly on Exchange or Lotus Notes servers.

A wild card in the market is CallWare Technologies, a Salt Lake City company that made something of a name for itself in the mid-1990s when it produced NetWare Loadable Modules for unified messaging. That was at a time when Novell was pushing NetWare Telephony Services.

But last year a new team of CallWare investors, led by NationsBank, brought in new management, C-T Link's Burton says. Then NationsBank rang up CallWare's remaining VARs, rewrote the company's Windows NT package and are now starting to move back up in market share. CallWare's channel strategy also includes a recently inked deal with IBM, which has set a strategic goal of entering the CTI market via a collection of third-party vendors' products.

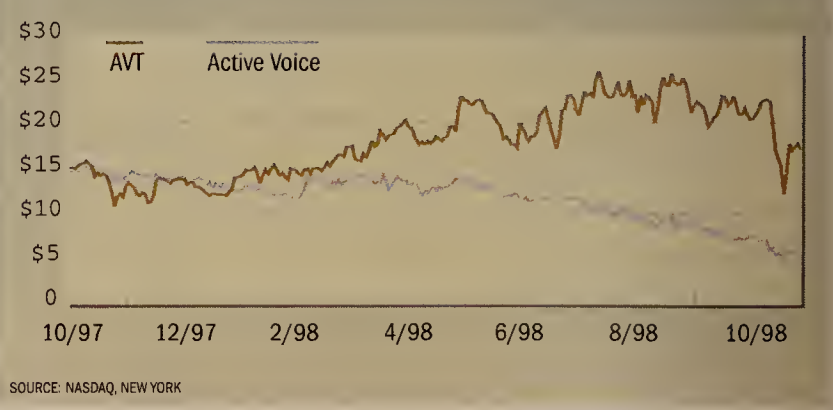
AVT, Active Voice and CallWare also enjoy a new opportunity to sell unified messaging, courtesy of the Year 2000 problem. AVT's Staples estimates that 80% of the national installed base of 750,000 voice mail systems are not Year 2000-compliant, and many big PBX vendors are forcing an upgrade to their most recent release to bring the systems up to specification.

"In the past, users haven't had a triggering event," Staples says. "Now they'll have to decide, 'Do we want to replace it with just another voice mail system, or do we want to replace it with a unified messaging system?' " The PBX vendors are sure to fight back. In the 1980s, independent voice mail companies burgeoned partly because many PBX vendors relied on outside vendors. "They would OEM solutions from some of the smaller companies," says John Myers, general manager of Nortel Networks' messaging-systems unit.

But now, "the switch vendors have come up with pretty compelling reasons to buy your messaging from the switch vendor," Myers says. ■

OFF ON A DIFFERENT PATH

AVT's diversification efforts have boosted its stock, while Active Voice's second-quarter loss this year has added to its precipitous fall:



SOURCE: NASDAQ, NEW YORK

BroadVision links commerce to ERP

Java-based "Command Center" supports links to call centers, voice response databases.

By Ellen Messmer
Redwood Shores, Calif.

BroadVision this week will unveil the Dynamic Command Center — software that ties the company's One-to-One Enterprise 4.0 commerce software into call centers and back-end enterprise resource planning (ERP) systems.

One-to-One — which includes "Commerce" for Web catalog sales, "Knowledge" for information dissemination and "Financial" for banking — can personalize each user's electronic commerce experience. Unfortunately, these applications lack a way to easily tie into the rest of the corporation's operations without writing a lot of custom code.

That situation will all change later this year with shipment of the Command Center's selection of prebuilt Java server and JavaScript hooks to a wide variety of customer service applications.

"We'll have the added capability to link to call centers, touch-tone centers and voice response systems," says Neerav Bery, senior director of product marketing at BroadVision.

Help's a button away

By adding BroadVision's so-called Web agent to a call-center desktop computer, for example, the online Web shopper who has questions could push a "call me now" alert.

That would prompt a customer service representative to contact the customer by phone or chat via the World Wide Web.

The Web agent software would also be able to pull a personalized profile about the customer out of a back-end database that might assist the customer support representative.

"We're very interested in what they're doing with this, and we do have plans to link our Web site to our 7,000-seat call centers," says John Samuel, director of interactive marketing at American Airlines. "There are a surprising number of two-phone-line households now, and we'd like to have the reservation agent and the customer looking at the same screen," Samuel says. American Airlines is evaluating exactly how to do this, and BroadVision's approach will be considered.

In addition, the Dynamic Command Center software modules will allow the Web-based One-to-One to share data with ERP systems that include SAP, PeopleSoft and Baan, as well as other applications, such as Documentum.

By opening up BroadVision's software to a wide variety of back-end databases, One-to-One users will no longer have to store customer data in BroadVision's own database.

"This means you don't have to duplicate what you may already have," notes Bill Agnell, senior product manager for One-to-One Enterprise.

Command Center will be sold as part of One-to-One, which typically costs from $80,000 to $300,000.

✆ BroadVision: (650) 261-5100

Barksdale broils in trial hot seat

The government's antitrust action against Microsoft began last week. The trial is taking an unusual approach, largely to save time. The original testimony is written in documents, and attorneys are given a chance to cross-examine witnesses in person. The big star of the first week was Netscape President Jim Barksdale. Here's how things played out in Round 1.

Monday, Oct. 19

Today was interesting, and it became more interesting as the day went along. The government broke open its antitrust case against Microsoft by charging that Gates & Co. tried to stomp Netscape into economic submission by using the "alleged" monopoly power of Windows to give Internet Explorer a nice spoon-fed monopoly of its own. No big surprise there. The government's legal eagles will try to prove that Microsoft has a pattern of stifling competition, an argument it backs with memos, e-mail and the videotaped testimony of Bill Gates.

Gates' ears must have been burning back in the other Washington as the feds essentially called the man with a kazillion billion dollars a liar. Gates claims he was not aware of any plot to divide the browser market with Netscape and was not involved in setting up a June 1995 meeting in which Microsoft allegedly proposed that Netscape pull out of the Windows browser market and focus on other platforms. Those pesky Department of Justice boys pulled out e-mail from Gates, dated five days before the big meet, wherein Bill carped about the threat to Windows posed by the then-dominant Navigator browser.

AP PHOTO/TYLER MALLORY

Netscape President Jim Barksdale *arrives at Federal Court Wednesday.*

Adding insult to injury, an attorney representing the 20 states involved in the suit said Gates lacked "intestinal fortitude" because he refused to testify in person. Ouch.

Today we also got to hear about Barksdale's testimony in which he said he was "stunned" when he heard about Microsoft's proposal to divide the browser market.

"I have never been in a meeting in my 33-year career in which a competitor had so blatantly implied that we should either stop competing with it or the competitor would kill us," Barksdale wrote in his testimony.

Tuesday, Oct. 20

Microsoft got its shot today with a humdinger of an opening statement. According to Redmond, Wash., barrister John Warden, the "Luddite" government is out to get Gates personally, and to do so, it is taking liberties with evidence, mostly by pulling e-mail messages and such out of context. Then Warden laughed off the federal lawyers' version of the Netscape meeting, calling it "fantastical."

Microsoft was far from through and tore into Barksdale good when he took the stand in person this afternoon. Warden blasted Barksdale for getting all cozy with the Justice Department and for pressing for government action just to get new business opportunities for Navigator.

Wednesday, Oct. 21

Fun day today! Warden lit into Gentleman Jim again, this time by charging that Netscape was the one that approached Microsoft about cooperating! Apparently, unbeknownst to Barksdale, Netscape founder Jim Clark wrote to Microsoft trying to get the company to use Navigator and just about begged Microsoft to buy a chunk of Clark's firm. This all just days before Barksdale signed on for Netscape duty. An alternately squirming and testy J.B. was not told about the Clark overture.

Thursday, Oct. 22

If I'm Barksdale, I've gotta be thinking, "Warden, let me out!" This is the third day that this bulldog Warden has been ripping at old Jim. Today Warden questioned whether it was Microsoft pressure that caused Netscape to give away Navigator, or if it was Netscape's plan all along. According to Warden, Netscape Wunderkind Marc Andreessen wrote a memo four years ago saying that his company was "absolutely committed to giving [Navigator] 1.0 away for personal use." First e-mails and memos haunted Microsoft; now they are giving Netscape a few fits.

Barksdale, who's been tough as nails, says that the creator of Navigator wasn't speaking for the whole company. I guess Clark and Andreessen can't speak for the company they co-founded.

Friday, Oct. 23

Day off. Barksdale must be psyched.

— Doug Barney

WHO'S RIGHT? MICROSOFT OR THE DEPARTMENT OF JUSTICE?

Attendees at NetWorld+Interop 98 speak their piece:

For Microsoft

"Microsoft is doing what every other company would do if it was in the same position."

Bryan Wood, computer specialist, Southeast Alabama Medical

"If the government brings down Microsoft, every large computer company that provides tightly integrated products should start to sweat."

Robert Huskins, senior IT manager, Cable & Wireless

PHOTOS: JEFF GARTIN

For Department of Justice

"No company should be allowed to dominate the software market by hostile brute force."

Edgardo Luciano, systems engineer, Stratasys Corp.

"You can't allow the market to be stifled by one monopoly. That would eventually lead you down a very proprietary path."

Kevin Mahoney, director of commercial systems, ODS Networks

THE MICROSOFT REPORT

A summary of the latest action involving the company.

By Christine Burns and Paul McNamara

DON'T STOP THE PRESSES. It's hard to say which was less of a surprise last week: the Yankees sweeping the World Series or Microsoft dishing out yet another boffo quarterly earnings report. While its lawyers busied themselves fending off the Department of Justice, Microsoft reported a third-quarter profit of $1.52 billion, or 56 cents per share. These numbers are up considerably from those posted for the same quarter last year, when the company saw a $959 million profit, or 36 cents per share. Overall revenue for the first quarter was $3.95 billion, a 26% increase over last year's total.

Known for downplaying good news in order to dampen expectations on Wall Street, Microsoft Chief Financial Officer Greg Maffei is quick to point out that Microsoft isn't the only high-tech company to have enjoyed a bang-up quarter. IBM, Sun and a half-dozen others beat Wall Street estimates as well. "Clearly the PC business is prospering," Maffei says.

HANDS UP FOR ENFORCEMENT. Forced to choose between the anathema of antitrust enforcement and the reality of Microsoft's juggernaut, computer industry leaders are apparently willing to take their government-prescribed medicine.

After hearing an address from Joel Klein, the assistant attorney general who heads the Justice Department's Antitrust Division, some 500 computer industry leaders were asked if they considered antitrust enforcement necessary.

A full 80% raised their hands, according to news coverage of the Agenda conference held last week in Phoenix.

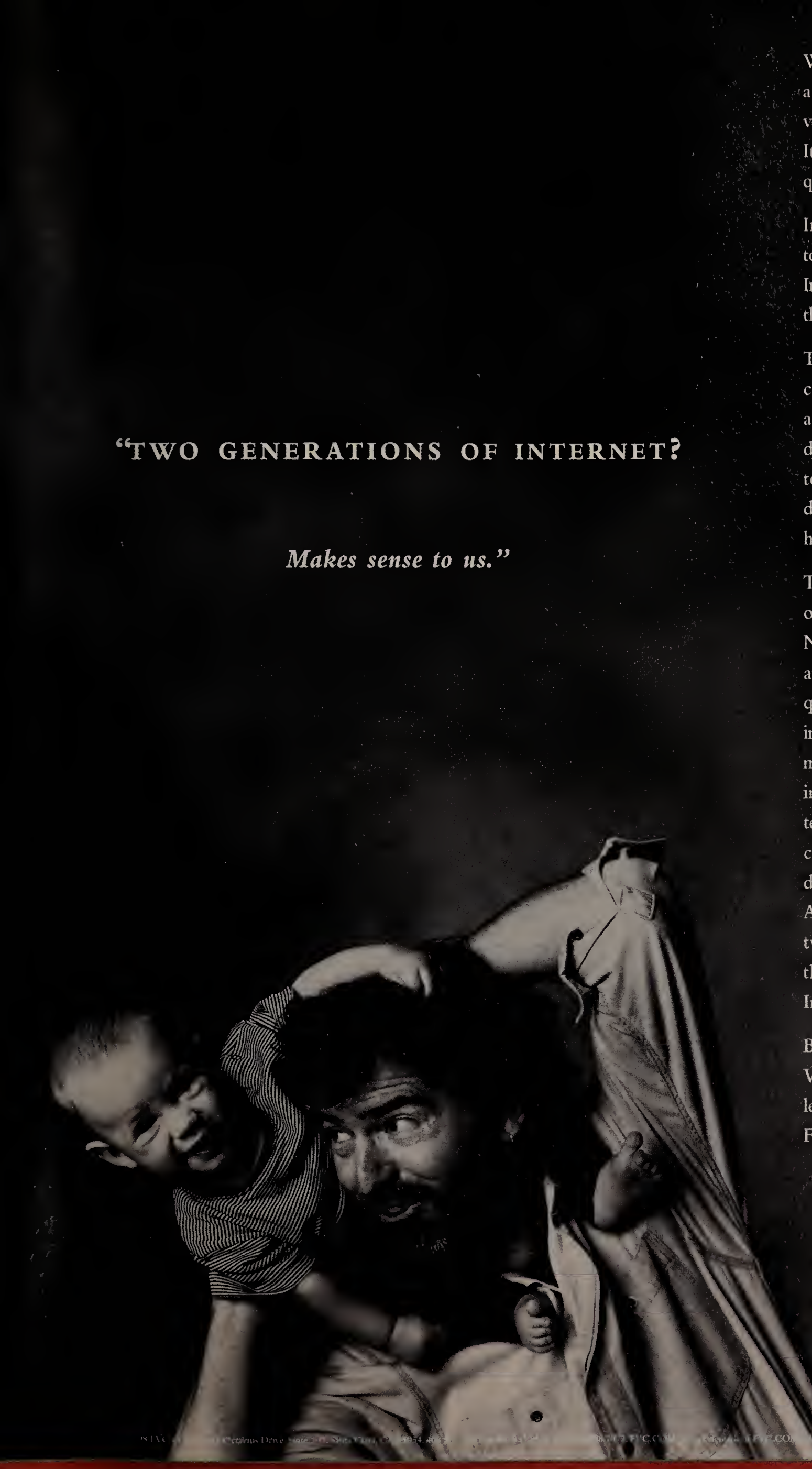
Microsoft, it should be noted, was not in attendance.

SHOOTING AT YOUR FEET. Microsoft may have a rare opportunity to move in on Novell's long-time and fiercely loyal base of NetWare administrators. Novell officials last week confirmed they plan to spend most of their marketing dollars in the near future trying to reach what they termed the "CXO audience," referring to companies' chief officers.

"The buying decision has moved up the food chain," says John Slitz, vice president of marketing. That's why Novell won't be preaching to its choir of NetWare zealots, mostly network managers, but instead will be looking to convert the CEOs and chief information officers of large companies.

"TWO GENERATIONS OF INTERNET?

Makes sense to us."



When it comes to video, we know a thing or two. Take streaming video over the Internet for example. It's jittery, slow, and doesn't have quality you can watch for long.

Imagine how surprised we were to hear there is a Next Generation Internet (NGI) that allows two-way, theatre-quality, interactive video.

Thanks to the NGI, a whole new class of revolutionary business applications are possible: from distance learning and meetings, to commerce, manufacturing, help desks, training, customer service, human resources and marketing.

The best news of all? You already own most of what you need. The NGI leverages your existing LANs and WANs to provide the highest quality one-way and two-way video in the world. Which explains why most companies pay for their NGI in less than six months just from telecom savings alone. That's not counting lower travel costs or dramatically increased productivity. Any way you slice it, high-quality, two-way video over the NGI is the next wave in commercial Internet applications.

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Briefs

■ **Shomiti Systems** *last week introduced Portable Surveyor, a hardware and software combination that lets field service engineers and network managers turn laptop computers into* **LAN analyzers.** *The product consists of Shomiti's Windows-based LAN analysis software as well as a 10/100Base-T CardBus network interface card and driver. Together, the hardware and software let net managers count and capture error packets. The software also helps speed problem resolution by summarizing events and suggesting solutions, Shomiti says. The product is available now and costs $4,995.*

Shomiti's *Portable Surveyor.*

✆ Shomiti: (888) 746-6484

■ **Hewlett-Packard** *last week said it is merging its enterprise systems group with its software and services group to create a $15 billion organization with 44,000 employees. With the new division, the company will be better able to present a consistent marketing message to corporate users, says Ann Livermore, general manager of the new* **Enterprise Computing Solutions** *organization. HP also will use the group to focus on specific user needs, such as enterprise resource planning.*

■ **Dell Computer** *last week announced that* **ON Technology** *has joined the Dell OpenManage Alliance, a program under which Dell ensures that third-party management software works well in Dell hardware environments. The companies will work together to customize ON's ON Command Comprehensive Client Manager software to recognize Dell machines. The ON product can be used to install and configure Microsoft operating systems, deploy Year 2000 BIOS updates and more.*

NCD broadens thin-client reach

Load-balancing software aims at enterprise scalability.

By Marc Songini
Mountain View, Calif.

Network Computing Devices (NCD) last week beefed up its Windows terminal line with software that features improved support for peripherals and sound, and a separate package that handles load balancing.

The software packages will work with NCD's ThinSTAR line of Windows terminals, which are compatible with Microsoft's Remote Desktop Protocol (RDP) or Citrix's Independent Computing Architecture (ICA) protocol.

The company's new NCD ThinSTAR Plus software allows peripherals — such as printers, bar code readers and other devices — to directly connect to NCD Windows terminals. ThinSTAR Plus supports serial devices attached to Windows COM ports and parallel port devices.

Peripheral support could be especially handy in point-of-sale situations in which a sales agent needs to print a receipt or scan an item but is running an application on a remote server.

The software also supports sound output and input in the form of WAV, MIDI and video files. Lack of sound support has been a general weakness of Windows terminal technology.

While the software supports sound applications on Microsoft's RDP and Citrix's ICA, NCD officials expect most sound applications will run over RDP.

Balancing the load

NCD also announced the rollout of ThinSTAR Load Balancing software, which works with Microsoft's NT Server 4.0, Terminal Server Edition or Citrix's MetaFrame terminal server technology.

NETWORLD+INTEROP 98

The basic approach of the software is simple. When a client attempts to connect to a group of servers, the servers communicate with one another and pick the machine with the most available memory to establish the session.

This approach helps keep individual systems from overloading and crashing, bringing down multiple users, NCD claims.

The company also says that such load balancing will improve the scalability of Windows terminal environments.

The load-balancing software is set up with the help of a graphical administration tool that runs on the server. NCD says server groups can be established without any special network configuration.

ThinSTAR *terminals get a software boost.*

According to NCD, both products will be available in November.

Pricing depends on configuration: ThinSTAR Plus will cost $59 per user for a 10-user pack; ThinStar Load Balancing will cost $79 per user for a 10-user pack.

✆ NCD: (800) 800-9599

NT clusters gain management luster

By Christine Burns

Houston-based NuView next month is expected to announce a new product that will help network administrators manage clustered Window NT systems.

NuView's ClusterX 1.0 works as an extension to the Microsoft Cluster Server (MSCS) administrator tool distributed with Microsoft Windows NT 4.0 Enterprise Edition, says Rahul Mehta, NuView's founder and president. While Microsoft's tool only allows an administrator to manually configure one NT cluster at a time, ClusterX lets administrators install, configure, monitor, diagnose and manage multiple clustered nodes from a centralized console, Mehta claims. With the software, an administrator can control both the NT system software and the applications running on top of clustered NT boxes.

"The point of NT clusters is high availability, and ClusterX makes sure that users get as close to 100% uptime as possible," Mehta says.

ClusterX, which will hit the streets sometime in December, will ship with a graphical user interface console that runs as a snap-in to Microsoft's Management Console. ClusterX will also have agent software that resides on the individual clustered nodes.

The ClusterX console provides a single view of all NT clusters and applications in the enterprise and allows a network manager to set server and application configuration parameters. These parameters can then be replicated to multiple servers. Additionally, an administrator can use ClusterX to set policies regarding how NT clusters are to be managed and then apply those policies across the enterprise.

PROFILE: NUVIEW, INC.

Founded:	1996
Headquarters:	Houston
Top management:	Rahul Mehta, CEO
Primary business:	Network management; NuView last year sold its ManageX Windows NT management tool to HP.
Financials:	Privately held
Fun fact:	The annual company retreat takes place at a dude ranch in eastern Texas.

Cliff Schommer, an NT systems engineer with First Union Capital Markets in Charlotte, N.C., says he could certainly use a tool that helps him manage multiple NT clusters. His company has 15 NT clustered pairs located in several sites around the world that support First Union's Microsoft Exchange backbone.

"We've spent a lot of time with Microsoft's tool trying to figure out how to correctly configure file shares and print queues on the clustered nodes. It would have been much easier to have that just once and then to have been able to populate that information to all of the NT clusters," Schommer says.

ClusterX has the ability to correlate event problems automatically across clustered nodes so that an administrator does not have to manually review event logs to determine the problem with the failed system.

The product also helps administrators keep a close eye on clustered hardware. One console view displays all current cluster configuration information as well as the state of all hardware resources. This can help an administrator pinpoint which part of the cluster hardware has failed.

Pricing for ClusterX 1.0 has not yet been determined.

✆ NuView: (888) 688-4390

Data General bridges NT/Unix gap

By Marc Songini
Westboro, Mass.

Data General wants to make life easier for its DG/UX customers that also run Windows NT by sticking both operating systems in the same server.

The server and storage vendor last week rolled out its latest high-end enterprise server, the Aviion AV 25000. The multiprocessing server can have separate partitions for NT and DG/UX, the company's Unix dialect. Users can assign certain chips in the server to run NT, and others to handle DG/UX. Both can be centrally managed from a PC, says Steven Aucoin, director of marketing for Data General's Aviion business unit.

The operating systems can also be connected within a single AV 25000 box and share data between their respective applications, Aucoin claims. The systems' connection is done by exploiting special API hooks. In-house developers or Data General's systems integration services can make these adjustments. With a bit of tweaking, for instance, users could run an Oracle database using NT as the front end and have a DG/UX application act as the warehouse, Aucoin says.

The enterprise-class box sports up to 64 Intel Pentium II Xeon processors. As an added bonus, the chips support Data General's Non-Uniform Memory Access (NUMA) technology.

The NUMA architecture, now under consideration by other major server vendors, including Hewlett-Packard, Compaq and Sun, allows each chip to have local memory and connect to the memory of other processors. NUMA does not rely on a centralized, fixed memory bus, which can be easily overburdened. And unlike typical NT symmetric multiprocessing (SMP) servers, which exploit 16 chips, a NUMA system can accommodate 64 chips and beyond.

New Aviion *blends NT and DG/UX.*

The AV 25000 can be equipped with up to 64G bytes of memory (8G bytes of memory per motherboard), 512K bytes of cache, up to 160 PCI slots, and has hot-swappable power and cooling supplies. On the software side, the box comes with the new M3W browser-based management tool, which lets the IS staff configure and diagnose the server from any desktop in the network or a dedicated console.

The company also announced a new option called disaster recovery clusters, which allow users to attach NUMA servers to Data General's high-end Clariion Fibre Channel storage devices at distances of up to 10 kilometers. With the high-speed Fibre Channel connections, users can copy data on the servers to a safe remote site; in case of a crash at the data center, the mirrored information can be retrieved from the remote facility.

One long-time DG user believes the AV 25000 is an attractive catch for NT/Unix shops, which will like the low I/O congestion NUMA offers. "It's awesome," says Peter Clark, manager of IS for Jordan's Furniture, an Avon, Mass., retailer. Clark's network now has the AV 20000 — the predecessor of the AV 25000 — and a Windows NT server running retail and sales applications. Clark says the AV 25000's ability to integrate NT and Unix would be ideal for server consolidation and is something he may consider.

The 32-way AV 25000 boxes will start shipping in 1999; pricing starts at below $80,000 for a four-way box.

✆ Data General: (800) 328-2436

The law hooks network pirates

Business Software Alliance targets networks.

By Doug Barney

This year D.O.C. Optics paid a whopping $139,000 extra for NetWare and other bits of software.

Was this retail optometry chain in a generous mood? Not exactly.

That's the fine D.O.C. paid for illegally copying NetWare and a host of packages from Lotus, Microsoft and Symantec.

While today this stands as an isolated incident, make no mistake. The Business Software Alliance (BSA), which represents eight leading software vendors, is getting serious about the piracy of networked applications. And the organization is not shy about pressing for fines or publicizing the names of those that copy its members' prized possessions.

Just as with desktop software piracy, disgruntled former or current employees are usually to blame for tipping off BSA officials.

But what may begin as a report of random copying of Word or Lotus 1-2-3 can quickly turn into a network manager's worst nightmare.

BSA tip line operators are trained to ask whether products such as Notes and NT are also properly licensed, warns Bob Kruger, vice president of enforcement for BSA and a former federal prosecutor. Of course, it is no coincidence that BSA members such as Novell, Lotus and Microsoft are making more and more money in the network space, and they see red when their software is pirated.

While most large corporations now recognize the problem, resellers may not. In fact, value-added resellers (VAR) are one of the biggest NetWare piracy culprits, Kruger says.

And if you know your VAR is selling you pirated software, you could be in just as much hot water as the VAR is when BSA investigators come to call.

The good news for software vendors is that large enterprises tend to follow license guidelines to the letter. "Many corporations don't pirate software because they need the product support," Kruger says.

However, there are cases in which companies have volume licenses but simply oversubscribe, or install more copies than they purchased.

In these cases, the BSA may get involved but oftentimes the vendor, valuing that customer's business, will work the problem out directly. ■

WIRED WINDOWS

It's silly season again

Maybe it's the influence of the toy manufacturers (with their pre-holiday advertising blitzes) or the automobile industry (with their fall rollout of the new model year products). Whatever the reason, computer hardware and software vendors seem to view the fall — and especially October — as the one time of year when it's absolutely necessary to grab the headlines in the trade press.

Dave Kearns

This condition should be called NICS — the NetWorld+ Interop and Comdex Syndrome. The companies hope to generate large amounts of traffic through their very expensive booths at these trade shows, no matter how lame their announcements are. As a result, I call this time of year the silly season.

Microsoft, for example, recently showed off some new telephony applications that will be included in a future version of NT — not in NT 5.0, however. Maybe in the version after that. Which means it might be out sometime before my grandchildren retire.

Then there's the annual press release battle of Microsoft vs. Novell about whose network operating system is faster, whatever that means.

But the silly season winner so far this year has to be Softway Systems, which recently announced that it had ported its Unix operating system (Interix) to run on a Windows NT platform!

Now people have been releasing this cross-platform stuff for years — there are a lot of programs to run PC and Windows applications on the Macintosh operating system as well as the major Unix platforms.

What makes this a silly season winner, though, is that, when you stop to think about it, how many applications can you name that run on Interix? I'm sure you can name some that run on Solaris, AIX, HP/UX, Linux, perhaps even venerable old Ultrix — but Interix?

There are the standard utilities available with Interix, so if you really miss VI, Grep and all those wonderful Unix utilities, you might want to check it out (although there are ports of most of these utilities that run natively on Windows NT).

You could also recompile your in-house created Unix applications to run on Interix. But I really doubt that Sun, Digital, Hewlett-Packard or other Unix vendors are going to supply you with the source code necessary to recompile their applications on your new Interix-on-NT platform.

The press release from Softway Systems touts "broad industry support" for its achievement, but it's not the business applications industry the company is talking about. It's the Unix to NT migration industry (as well as, of course, Microsoft) that is applauding this move.

I'm not applauding, and you shouldn't be either. There are much better ways to spend your company's money.

Kearns, a former network administrator, is a freelance writer and consultant in Austin, Texas. He can be reached at wired@vquill.com.

Tip of the week

A tip of the hat to Michael Dell for canceling his keynote address at Comdex, after rightly concluding that nine was far too many keynotes. Now if only Eckhard Pfeiffer, Bill Gates and Larry Ellison would follow suit (or if we all simply passed up their sessions) it just might convince the Comdex folks that "keynote" does not equate to "marketing opportunity."

WHAT EXACTLY
IS IBM'S

POSITION

ON WINDOWS NT SERVERS?

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e-business also means looking at PC networks in new and significant ways. And it's probably not much of a surprise to hear that Windows NT® has become one of the most popular new operating systems in the corporate world.

FACT

In 1997, use of The Windows NT Server operating system grew by 139% worldwide, reaching a 34% share of all server operating systems (source: IDC).

What you may not know is that IBM is building Intel®-based servers with the power to run the major business applications — from companies like SAP, Baan, JD Edwards, Oracle and QAD — used in the largest of corporate networks.

But it isn't power and reliability alone that distinguish Netfinity servers from their would-be peers. It's that they come loaded with things like IBM Netfinity Management tools — a comprehensive set of standards-based software tools that make it easier to manage and run your network. And that when you add advanced e-business tools like Web Server Accelerator (it's free on the Net), you can optimize performance by up to 60% when a Netfinity 7000 M10 server is used to serve up the Web.* It's that we work with industry leaders like Intel to bring new, more powerful technology to market — in servers designed to use it to its fullest.

The Netfinity 7000 M10 server, for example, is powered by the new Intel Pentium® II Xeon™ processor 400 MHz, providing it with some of the highest performance benchmarks in its class. (Visit www.pc.ibm.com/us/techlink/srvperf for details.)

History, plain and simple, also separates Netfinity servers from all others. IBM has been building mission-critical systems for the corporate world for decades, and now we've applied that expertise to the world of Windows NT. Netfinity servers are the first to offer scalable parallel technology with a clustered system and hot-plug PCI implementation. Netfinity servers also offer scalability features you don't expect in a server running Windows NT — like the ability to hot-swap hard disk drives, adapters, power supplies, and more — without taking your network down. Netfinity servers are also quick and easy to integrate into your existing IT infrastructure, whether it's powered by IBM (thank you) or not.

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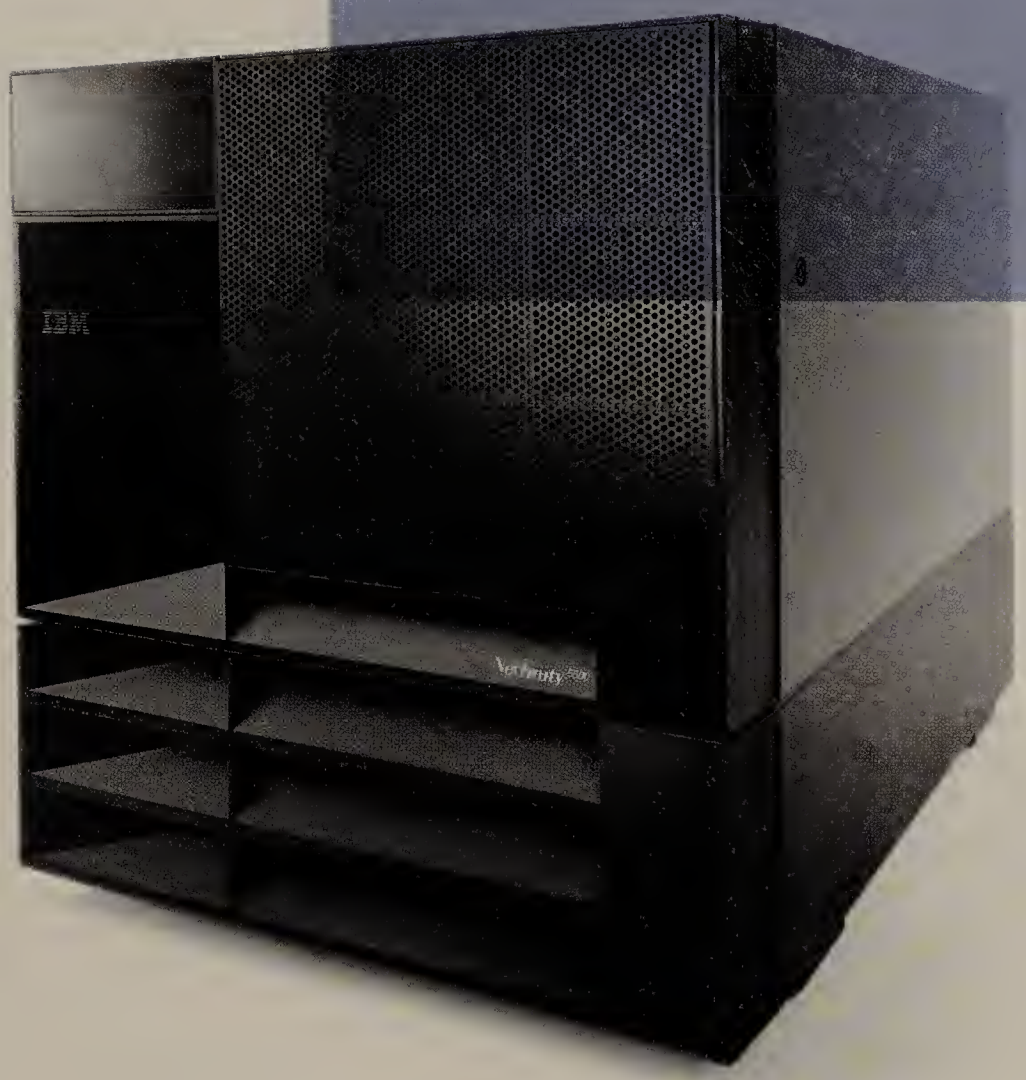

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The real explosion of Windows NT servers has been at the departmental level — starting with desktop computers and then connecting those desktops into larger networks, enterprise servers and legacy systems.

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FACT

A server is a repository of information, information that quickly becomes powerful business intelligence when fully exploited. This is e-business. Knowing more about customers, what they need and want. Mining growth out of details. Uncovering new markets (and margins) from within.

All these people connected via Windows NT servers also need access to the detailed information that resides on the more powerful systems that are the core components of a major enterprise (like, say, an IBM RS/6000 SP UNIX® server capable of processing millions of transactions a second). In such a world, the ability to quickly and seamlessly integrate departmental Windows NT servers into your larger IT infrastructure is critical.

Netfinity servers, like the new Netfinity 5500 M10, help simplify this integration. Take, for example, IBM Netfinity Manager software. It ships with every IBM Netfinity server. It's platform agnostic. It lets you manage clients and servers from dozens of leading manufacturers. It also helps you tie your Windows NT network into enterprisewide management software such as Tivoli® Enterprise,™ Microsoft® SMS™ and Intel LANDesk.™

This is what e-business is all about — not just building powerful servers for departmental use (and make no mistake, the Netfinity 5500 M10 can handle everything from huge e-mail networks to 24/7 Web commerce), but also providing tools to integrate and manage those servers as part of a much larger network. This helps you control costs and keep your network up and running.
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IN THE

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*Netfinity 7000 M10 performance, configured with four Intel processors and running Microsoft Windows NT, compared to next best competitor results on SPECweb96 benchmark as of July 17, 1998. Server configuration and test environment may vary. †Estimated reseller price to end users for model 86801RU (Netfinity 7000 M10), 86611RY (Netfinity 5500 M10), 84761GU (Netfinity 3000). All include IBM 4.5GB hard disk drive. Certain features described are available for an additional charge. Network operating system not included. Actual reseller prices may vary. MHz denotes microprocessor internal clock speed only; other factors may also affect application performance. For terms and conditions or copies of IBM's standard Limited Warranty, call 1 800 772-2227 in the U.S. Limited Warranty Service in those countries where this product is sold by IBM or IBM Business Partners (registration required). IBM product names are trademarks of International Business Machines Corporation. Microsoft, Windows and Windows NT are trademarks of Microsoft Corporation. Lotus, Domino and Domino Intranet Starter Pack are trademarks of Lotus Development Corporation. Intel, the Intel Inside logo and Pentium are registered trademarks and Pentium II Xeon is a trademark of Intel Corporation. Other company, product and service names may be trademarks or registered trademarks of others. © 1998 IBM Corp. All rights reserved.

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That's a very affordable server — but not a stripped one. Like all Netfinity servers, the Netfinity 3000 comes standard with Lotus® Domino™ or Lotus Domino Intranet Starter Pack,™ not to mention Netfinity Manager software.

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Every Netfinity server includes a 3-year limited warranty and 90-day Start Up Support. Leasing plans, automatic 2-year product refreshes, customizable support, system installation and integration are available, if you desire, through our SystemXtra program.

FACT

Of course, the value, quality and reliability of the Netfinity 3000 server is such that a whole bunch of not-so-small businesses will choose them by the dozens for things like print spooling and file management. Not the most glamorous tasks, but the day-in, day-out, got-to-be-dependable side of e-business.

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Briefs

Eicon Technology *last week announced a slew of new* **Web-to-host products,** *including HotConnect software, which provides device failover in mixed SNA/IP networks.*

If the IP connection to the client goes down, HotConnect can switch to another IP gateway or utilize a local SNA gateway as a backup.

For instance, if users are migrating from a NetWare for SAA gateway to a tn3270e gateway, they can configure the NetWare for SAA gateway as a backup. Should the tn3270e server crash, HotConnect will reconnect sessions via the SAA gateway without the user being aware there was a switchover.

Eicon says the software will be built into its upcoming Aviva Family of host access packages. Also on tap for the Aviva family are a Java tn3270 emulator called Aviva for Java and Aviva Web-to-host server software for converting passive 3720 screens into interactive HTML pages.

The packages all run on Windows NT servers or clients. Pricing was unavailable. The products should be on sale by year-end.

© Eicon: (800) 803-4266

High-speed router start-up **NEO Networks** *last week* **appointed Mack Traynor as its new president and CEO.** *Traynor replaces company co-founder Gary Doan, who had planned to step down in favor of someone more skilled in operations management, company officials say.*

NEO is working to ship its StreamProcessor massively parallel router products in the next two months. The company has garnered some $13 million in venture funding and plans another round in 1999. Neo will compete with other high-speed router companies, such as Argon Systems, Avici, NetCore . Systems and Pluris.

In-Site

Indus River gear helps firm boost bottom line

By Tim Greene

With its remote work force growing rapidly, Keane, Inc.'s 800 number access costs have tripled since January. But with new hardware that lets workers call in via the Internet, the network consultancy's Chief Information Officer Dave Dengler hopes to cut those costs and pay for the new gear in six months.

Keane, an integration services firm in Boston, helps large enterprise customers with application development and outsourcing, Year 2000 compliance, and help desk technical support. In a year, the company grew to 10,000 employees from 8,000, and its 800 number costs rose from $18,000 to $56,000 in that same period. Keane was looking for a better way to disseminate centrally located information to its remote consultants.

Enter Indus River and its RiverWorks virtual private network (VPN) package.

Now rather than call the 800 number to reach the firm's Ascend MAX server, each remote user can connect to the Internet and establish a secure encrypted connection with Keane's headquarters via RiverWorks.

Keane CIO Dave Dengler *wanted a way to significantly reduce his remote access costs.*

With the 800 network access number, each connection meant an additional charge. But with the VPN, users can make as many connections as they want for one flat fee — the cost of the remote Internet connection.

Authentication and authorization are granted through the same Remote Authentication Dial-In User Service server Keane uses with the direct-dial system.

Dengler says the VPN also helped him avoid a $9,000-per-month trans-atlantic T-1 link he would have needed to install to connect Keane headquarters to Keane, Ltd. in the U.K. Even without that savings, the break-even point for the Indus River VPN gear is 1,000 users each connecting for two hours per week — that falls well within the company's actual use, he says.

RiverWorks is sold as a system with pricing based on the number of authenticated users per month.

While the Indus River hardware and software doesn't give Keane everything it wants, Dengler says the new technology is a step in the right direction.

With Indus River software loaded on the remote clients and the RiverWorks server at the central site, Keane can support up to 2,000 remote users at once, which is enough to allow every currently authorized remote dial-in user to call in at the same time. The company plans eventually to put all 10,000 of its consultants on the VPN, Dengler says.

The main goal of the VPN is to give Keane consultants access to the company's knowledge database, a compilation of data that describes important application development procedures and business practices that consultants need to impart to their clients.

See **Keane,** *page 24*

SHAWN HENRY

Intel buys Shiva to grow IP business

Shiva's VPN gear and sales force are worth the $185 million, Intel says.

By Tim Greene
Hillsboro, Ore.

Intel's acquisition of Shiva last week was a quick way for the company to get remote access and voice-over-IP technology it could sell to mid-size businesses.

Even though Shiva just turned its first profitable quarter since CEO Jim Zucco took over in 1997, Intel found Shiva's LANRover virtual private network (VPN) gear attractive enough to spend $185 million for the company, Intel officials say.

In addition, Intel wanted Shiva's sales force to push Intel's own network gear, says Mark Christiansen, vice president and general manager for Intel's network products division.

Intel wants to add VPN devices to its product line, and Shiva's LANRover VPN Gateway will fit the bill. Intel also wants to complement Internet VPNs with voice-over-IP capability, a feature Shiva announced last week for the LANRover at NetWorld+ Interop 98 in Atlanta.

Intel already has low-end ISDN routers with VPN capabilities that rely on proprietary encryption. But with the purchase, both firms said their gear would adopt the IP Security (IPSec) specification as soon as it is approved by the IETF. Approval is expected later this year. IPSec automatically authenticates users and encrypts traffic over IP nets.

Shiva CEO *Jim Zucco was bringing Shiva into the black.*

Some concerns

While the deal probably means a much more stable financial future for Shiva than it could expect by itself, some observers are concerned.

"I would consider it a negative, especially being bought by someone as big as Intel, where Shiva could get lost in the shuffle," says Mike Lutz, network manager for Norand, a maker of ruggedized laptops.

Norand uses LANRovers for remote access to some of its divisions. "I don't want the company to fall apart, so there's no way the products I have can be supported anymore."

While Intel says it wants to aggressively integrate Shiva remote access gear into its product line, Intel's focus remains on selling processors, says Virginia Brooks, an analyst with Aberdeen Group, a consultancy in Boston. "Intel always operates with the ulterior motive of, 'How can I make

See **Intel,** *page 24*

Keane

Continued from page 23

Use of the database has grown because the number of employees has increased and because the company has encouraged its use. Dengler says the database's use is increasing even more since he started phasing in the VPN last month.

In addition to saving direct costs, Dengler hopes the VPN will reduce calls to Keane's eight-person help desk. The Indus River client, RiverPilot, walks users through possible corrections whenever the software has trouble making a secure connection. The feature resolves some problems before remote users have to make a help desk call, Dengler says.

Over time, with the number of users on the rise, the size of the help desk will inevitably increase, but RiverPilot should help minimize growth, Dengler says.

Distributing the remote client is the biggest chore at the moment, but Dengler says he is streamlining the process. Rather than loading the software on each laptop at headquarters, RiverPilot is now downloaded to remote servers via dedicated lines to Keane's 45 remote offices in the U.S. The software is then loaded on laptops locally when workers come to the office, he says. The laptops run Windows 95.

In addition, Indus River is adding Novell's ZENworks management software to its RiverWorks Management Server, which should speed automation of the distribution process, Dengler says.

He also says he looked at VPN hardware and software from other vendors but rejected the vendors because they could not establish a secure connection from a remote LAN. Some of Keane's consultants work at client sites and have Internet access through dedicated Internet connections from the clients' headquarters. Dengler is currently working out a pilot program with a Keane client to test that capability.

Consultants who work at client sites must currently ask their managers to contact the knowledge database for them, Dengler says. ■

Intel

Continued from page 23

them need more processing power?' " says Brooks.

She sees Intel's network division as targeting high-volume smaller businesses rather than the high-end large enterprise customer. "I can't see that Intel has a business model that plays to the high end of things," she says.

Intel acknowledges as much, although Christiansen says the LANRover VPN Gateway would fit well into the branch or regional offices of large enterprises, particularly those that have limited IT expertise. "Intel/Shiva network gear will let small enterprises meet their needs but not require the typical investment in skills and equipment traditionally associated with data networking," he says.

The deal announced last week came after a two-year slide in Shiva's stock price, which started at near $80 and has fallen to about $5.50. Christiansen says the deal would likely be completed by the end of 1998 barring unforeseen problems with regulators.

Brooks says the deal would give Intel's network division the flavor of Compaq Computer's network division. She likened the deal to Compaq's purchase last year of remote access specialist Microcom. ■

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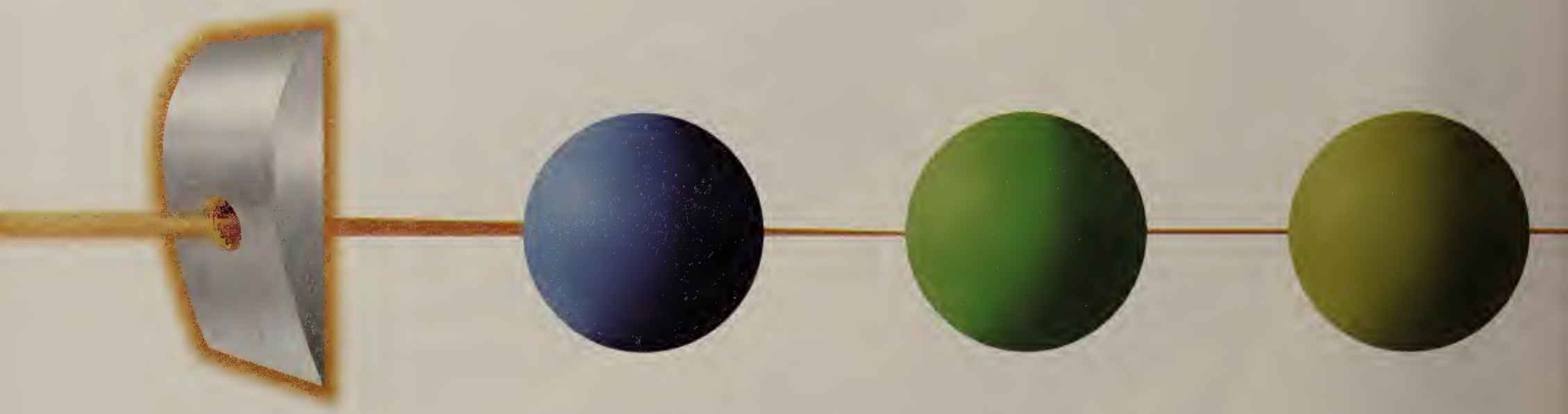

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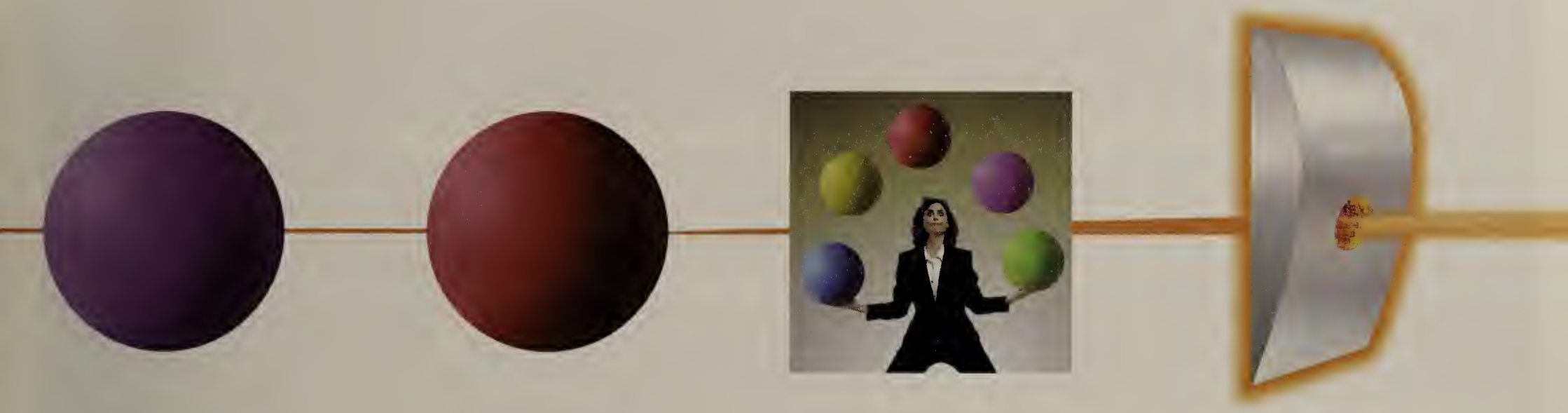

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Briefs

■ **Vice President Al Gore** *urged a meeting of international telecommunications officials to* **get moving on Year 2000 compliance.**

Gore: *Sounding the Year 2000 trumpet.*

Failure of foreign carriers to upgrade their systems could threaten international commerce, Gore told an International Telecommunication Union meeting in Minneapolis last week. "We must ensure that the international system is ready for the year 2000 because one weak link in the system will hurt us all," Gore said.

■ **For the second time this year,** *the Federal Communications Commission has* **rejected an application by BellSouth** *to enter the long-distance market in Louisiana.* **The FCC** *says BellSouth has made progress in enabling local competition in Louisiana but ruled that the company's electronic systems for sharing order-entry data with competitors is still not up to snuff. The FCC has rejected five regional Bell operating company long-distance petitions, with others being withdrawn before they came to an FCC vote.*

■ **Nortel Networks and Matsushita Communication Industrial** *last week said they will work together to* **trial wireless networks** *based on wideband Code Division Multiple Access mobile technology. The companies will launch a series of service and marketing trials, starting in North America and then moving to Europe and Asia early next year. Nortel will build the experimental network infrastructure, while Matsushita will provide Panasonic brand handsets for the trial,according to the companies.*

Global One announces new ATM services

By Kristi Essick and David Rohde
Paris

A new ATM service from Global One is aimed at multinational companies that want to connect branches in different countries via a managed high-speed telecommunications and data network.

Global One, the joint telecommunications venture between Sprint, France Telecom SA and Deutsche Telekom AG, has launched the Global ATM service in 13 countries, including the U.S., Canada, Belgium, Denmark, Israel and Japan.

The Global ATM service can carry voice, data and Internet services simultaneously at up to 155M bit/sec. Ideally, the service will save companies money because they can integrate their existing data networks, such as frame relay and leased-line voice networks, into one ATM network, Global One says. The other user benefits are increased reliability and service guarantees, the company says.

Global One will monitor the Global ATM service 24-7. Network automation software carries out fault protection, proactive monitoring, testing and diagnosis, and automatic corrective actions. Global One will also offer local support services on a 24-7 basis.

Behind Global One's ATM service is a newly unified global network of about 100 Magellan ATM switches from Nortel Networks, which incorporates Sprint's Nortel domestic ATM network. The switches are being used for more than the Global ATM service.

Just as Sprint in 1997 moved its domestic frame relay service to the Nortel domestic backbone to offer new classes of frame relay service, Global One has moved its Global Frame Relay service to the Nortel international backbone, says Tim Colis, Global One's director of product management.

The result is better frame relay and ATM integration. For example, Global One now has nine Nortel switches in the U.K. alone, shortening the access links that users must purchase to reach the international backbone. In other countries, though, there is still only one Nortel switch and a connection must be made between the Global One international backbone and the domestic ATM network using other switches.

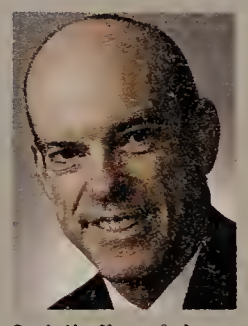
Access speeds for Global ATM will begin at T-1 and rise to OC-3, with Global One supporting ATM Inverse Multiplexing for users who don't want to make the leap from T-1 all the way to T-3 when traffic grows. One hole remains: Global One does not yet support international frame relay-to-ATM interworking so users can pick frame relay at some sites and ATM at others without having to construct two separate international WANs. That ability is coming in 1999, Colis says.

Global One declined to disclose prices for Global ATM.

Essick is a correspondent with the IDG News Service in Paris.

Sprint earnings get a boost

Sprint surprised Wall Street analysts last week with banner earnings.



Sprint's *Esrey feels prosperous.*

The nation's third largest carrier posted a net income of $239 million for the third quarter, ended Sept. 30, up 13% from $212 million for the same quarter one year ago. Revenue increased to $4.06 billion, a 7.5% jump from $3.78 billion last year.

Sprint's long-distance division contributed substantially to the positive results, says Sprint Chairman William Esrey. Sprint's long-distance revenue jumped 9.2% to $2.46 billion from $2.25 billion in the third quarter last year.

Sprint, based in Kansas City, Mo., says gains in operating income and calling volumes helped results, although losses from joint ventures in the U.S. and abroad reduced earnings.

"The third quarter was another indication that our core operations are prospering," Esrey says.

The company's revenue was driven by high demand for data services and new phone line installations; they offset losses in Sprint's emerging markets and wireless units.

— IDG News Service

Satellite services with a twist

By Denise Pappalardo
Atlanta

CyberStar, L.P., a newcomer to the world of satellite-based wireless services, is offering a global broadband IP Multicasting service that lets business users send large voice, video and data files to remote branch offices.

The CyberStar Service is the company's first high-bandwidth transport service. The offering is designed to let users broadcast high-bandwidth files such as corporate training videos or large data files to users around the world and pay only for the bandwidth they use, says

NETWORLD+INTEROP 98

Christopher Dittmer, vice president of worldwide marketing at CyberStar. Other services require users to sign up for a flat fee.

CyberStar Service pricing is based on the amount of traffic sent each month and the number of sites receiving the transactions. For example, a customer will pay $2.60 per site to transmit 250M bytes worth of traffic to 301 to 600 sites, which translates to a range between $783 and $1,560.

Customers with higher bandwidth demands will logically pay more. Those who send 1G bytes worth of traffic per month to 301 to 600 sites will pay $8 per site, or between $2,408 and $4,800.

Customers are charged initial installation costs that run about $1,100 per site. The fee includes antennas, satellite receiver cards and service activation.

CyberStar has not launched its own satellites to support the services, but uses its sister company SkyNet's GEO satellites. CyberStar and SkyNet are Loral Space & Communications subsidiaries. To ensure redundant global coverage, CyberStar will also team with other satellite companies as the service grows, Dittmer says.

Early next year, CyberStar will launch a videostreaming service that will let users send traffic over CyberStar's network in real time. The company's current services are based on store-and-forward technology.

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WAN MONITOR

Using ISDN for VPN remote connectivity

For the past two installments of this column, we've explored different remote access options for virtual private networks (VPN). We began by defining our criteria for a solid VPN implementation, and last time, we held cable modems up to these requirements.

In this column, we rate ISDN Basic Rate Interfaces by these same measures. As a refresher, we proposed that an effective VPN access package had to meet the obvious security, cost and performance measures but said we also wanted to see static IP addressing, "always on" technology and sufficient bandwidth to carry users through application convergence.

Here's how ISDN stacks up:

Dedicated/static IP addresses. As with cable modems, this one depends on the provider, but it also depends on the ISDN gear you choose. In general, there are two types of ISDN customer premises equipment (CPE) devices: those that behave like routers and those that behave like modems. Until recently, the router-type device required a static IP address and additional static IP addresses for all of the hosts behind it. But most vendors have added support for Dynamic Host Configuration Protocol to these routers, so now nearly all ISDN devices can function in a dynamic IP address environment. So, again, you're at the mercy of your service provider.

Always on. Unlike analog modems, ISDN devices can set up a connection with an ISP fairly quickly. Is it quick enough to be transparent to a user? No. Also, if a co-worker tries to reach you via IP telephony or video, you must have an established connection to be available. The Always On/Dynamic ISDN Network Architecture (AO/DI), an initiative announced last year, addresses this issue.

Daniel Briere
Christine Heckart

Bandwidth requirements. AO/DI makes use of ISDN's 16K bit/sec D channel, which is always on, for low-bandwidth data transfers, e-mail notifications and other traffic. B channels can be dynamically added as necessary. This represents a major improvement for ISPs and telcos by freeing up committed, but unused, capacity.

It's also attractive for end users, as B channels can support telephony and fax. Unfortunately, all vendors or ISPs do not yet support AO/DI.

In terms of price/performance, ISDN is a distant third to cable modems and digital subscriber line services. With regard to simplicity, even with recent improvements in equipment and configuration software, the technology is extremely challenging to set up.

Does all of this mean that ISDN has no future in the world of application convergence and VPNs? Not by a long shot. Due to widespread availability and a large installed base, ISDN is far from dead. In many locations, it's still the only broadband alternative to analog modems and will be for some time.

Briere is president and Heckart is vice president of TeleChoice, a consultancy in Boston. They can be reached at dbriere@telechoice.com and checkart@telechoice.com. Eric Zines, a TeleChoice VPN analyst, contributed to this column.

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SPECIAL FOCUS

The Internet2 project

Will 'Net2 mean QoS for you?

Universities team on Internet2 project to test quality of service for the masses.

By Denise Pappalardo

While the leading national ISPs are hesitant to deploy leading-edge quality-of-service (QoS) technologies, universities and colleges that are part of Internet2 are diving right in.

Universities participating in Internet2, a project put together by the University Corporation for Advanced Internet Development to link more than a hundred research universities over a ubiquitous IP network, are also creating a QoS test bed designed to push pending IETF QoS specifications into working networks.

The universities involved with Internet2 recently formed a QoS Working Group to head the development and deployment of the QoS test bed called the QBone.

Initially, the QBone will let users on multiple university networks use the IETF's pending Differentiated Services (Diff-Serv) QoS specification to send and receive voice, video and data traffic.

Diff-Serv is a technology that will let users mark packets with labels called Per Hop Behaviors (PHB), which will let users prioritize traffic. Diff-Serv uses the type of service field header included in every IP packet to store the PHB information so a router or switch knows how to handle a packet.

Many ISPs have talked about the benefits of Diff-Serv, but without a complete standard, providers won't commit to the technology (*NW*, Oct. 12, page 8). But those involved with Internet2 project do not have to worry about whether the standard has been set.

End-to-end QoS

Internet2 is being geared to support what is called multidomain, or end-to-end QoS, says Ben Teitelbaum, an Internet engineer at Internet2 and chair of the QoS Working Group. The IETF's pending specifications for the Diff-Serv architectural components are a long way from being completed, Teitelbaum says.

But Internet2 engineers have a pretty good idea of how they are going to set up the QBone (see graphic). The idea is to initially support a premium service based on Diff-Serv parameters.

In order to ensure that the network is sending and receiving traffic based on Diff-Serv parameters set by users, Teitelbaum says the QBone will be using Bandwidth Broker servers at each network. Bandwidth Broker servers are control and resource management servers for routers that are receiving traffic with Diff-Serv PHBs. If an application, such as multicasting, is supposed to get premium bandwidth over the network, Bandwidth Broker reserves the appropriate bandwidth.

And any vendor's routers will do. "We are deliberately seeking to explore a diversity in Diff-Serv technologies — including a variety of different vendor [packages] as well as a variety of cloud architectures," Teitelbaum says. "For example, we expect that the QBone will include both IP-over-SONET and IP-over-ATM Diff-Serv implementations.

An Internet boost

"There are many facets to Internet2 such as its advanced high-bandwidth application developments in multicasting, network development in the policy routing arena, and an IPv6 test bed," Teitelbaum says. But improving the overall quality of the Internet is important to anyone involved with the 'Net."

The QBone will first only include a handful of university networks and several Internet2 corporate partners, such as Newbridge Networks and 3Com, which have submitted proposals to participate in the test bed.

Because the QBone is attempting end-to-end QoS over multiple networks, the QoS Working Group wants to choose universities that are already interconnected.

The university connection

For instance, in California a series of research universities are connected to the California Research for Education Network 2 (CalREN2).

CalREN2 connects the California Institute of Technology, California State University, Stanford University, University of California and University of Southern California via two OC-48 fiber rings provisioned by Pacific Bell.

The Internet2 backbone, called Abilene, will be made up of 16,000 donated route fiber miles of Qwest Communications' OC-192 network.

The Internet2 project will connect campuses with a high-speed internetwork expected to operate at 2.4G bit/sec by 2000. QoS issues aside, Internet2 will also help users develop advanced applications in areas such as media integration and real-time collaboration. Universities and industry players have pledged some $65 million in each of the next three to five years to help build the Internet2 infrastructure.

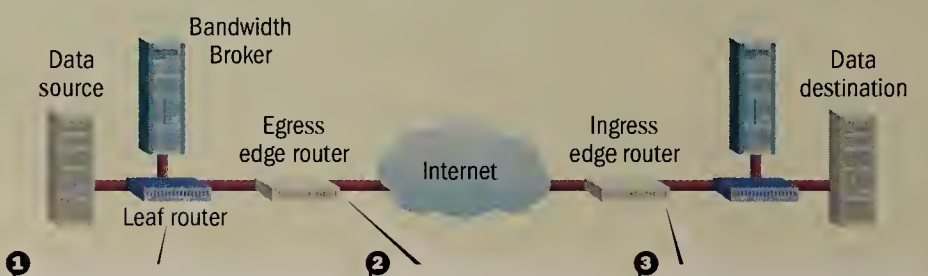
Internet2 is expected to be in full operation by 2000 and is being designed to help researchers share and obtain information more rapidly than is possible with today's sometimes congested Internet.

Portions of the network are already in place, but it's still a work in progress. Some universities are also connecting to the Internet2 backbone through MCI WorldCom's very high speed Backbone Network Service.

The QoS Working Group hopes to demonstrate the first working, multidomain Diff-Serv network by the first quarter of next year. Perhaps its work will push the IETF standards process along and push QoS into your ISP's network. ■

BUILDING QOS INTO THE INTERNET

The Internet2 QoS Working Group is expected to have its Diff-Serv test bed in place by year-end. Here is a peak into what the network will look like.



1. Traffic sent from the data source passes through the leaf router. Packets are marked based on predefined Diff-Serv PHBs that are stored in the Bandwidth Broker servers.
2. The egress edge router reads PHB information on the packet headers and sends traffic accordingly.
3. The ingress edge router accepts traffic based on its PHB information and forwards the packets to their appropriate destinations.

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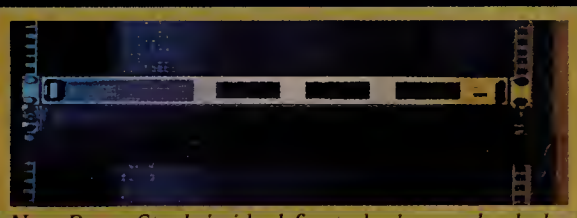

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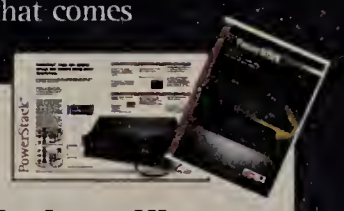

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THE FIRST STEPS ARE EASY, BUT THE JOURNEY CAN BE DIFFICULT.

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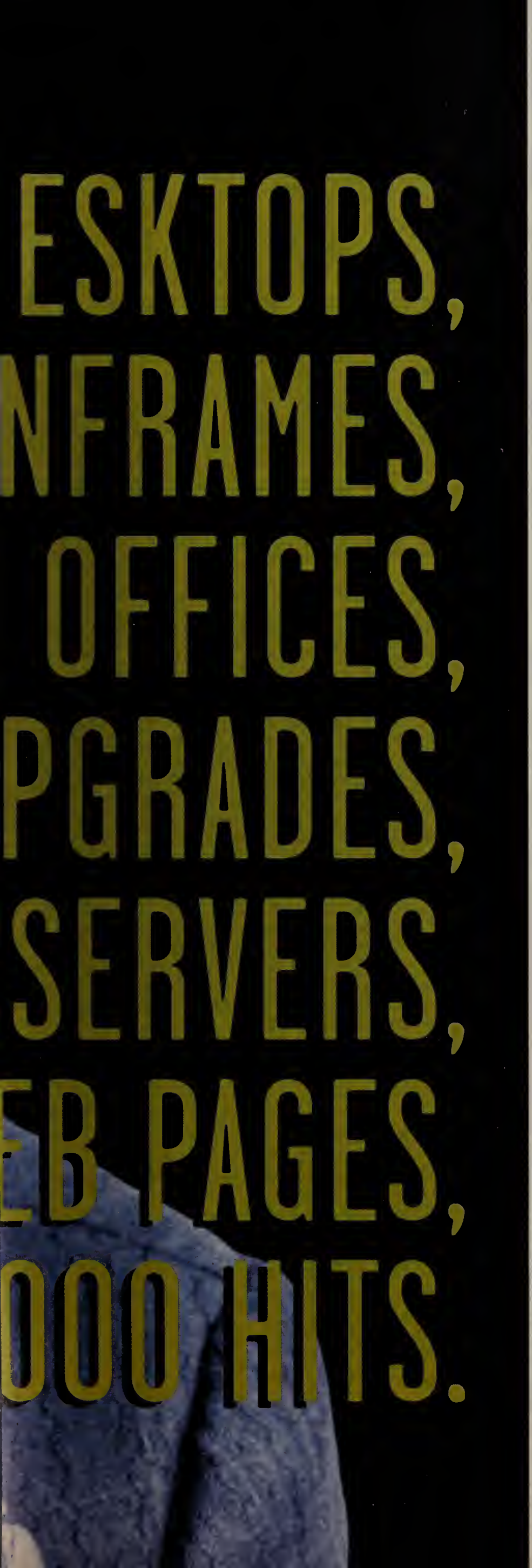

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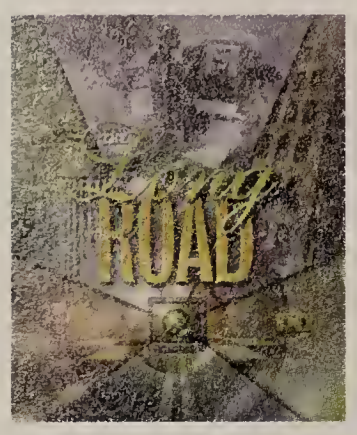
FEATURES



Cover photo: Tom White

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Go online for these additional features on Web-to-legacy integration:

- **Beyond the green screen: A look at how traditional host access vendors are bringing the World Wide Web to their products.**
- **Security sensitivities: Tips for making sure you don't expose invaluable host data to wayward browsers.**
- **Whipping up one big Web server: An examination of how and why you'd want to turn your mainframe into a giant Web server.**

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INTEGRATION INITIATIVE

Cindi Love has set the Web-to-legacy integration course for The Toro Co.'s landscape products business. **Page 13.**

FROM THE EDITOR

Will opening legacy data to browser-enabled employees, business partners and customers profoundly change the way the business world operates?

Many of the network managers and IS professionals we talked to for this special legacy integration issue certainly think so. Take Ashok Santhanam, CEO of Inventa, a consulting firm in Santa Clara, Calif., that spends about half its time working on Web-to-legacy integration projects. In our cover story, beginning on page 6, Santhanam says he believes the availability of legacy data via the Internet will eventually change business as significantly as did the Industrial Revolution.

It's a dramatic statement, but one that carries a good amount of truth. The World Wide Web offers companies the flexibility to do all kinds of things with the legacy data they've amassed. Innovation should be, and at many companies is, rampant.

Take the case of Fujitsu PC in Milpitas, Calif. Web-to-legacy integration allowed it to open a new line of business. The company launched a sales division that markets refurbished laptops only through its Web site. (Go to www.nwfusion.com and use DocFinder 9403 for more details.)

Computer and network companies have acclimated well to this world of Webified legacy data, but firms in other vertical markets are showing just as much spunk. Financial services firms, utilities, manufacturing outfits, state and local governments, health care organizations — they've all found benefits in hooking browser-wielding users into their legacy systems. Doing so empowers the employees, business partners and customers who are privy to such access.

When it comes down to it, a company should have little reason not to Webify legacy data. The tools are available, employees and customers can usually benefit from having more information and, last but not least, chances are competitors already are doing so.

I'd have to say, "Yes, opening legacy data to Web users will have a profound impact."

— BETH SCHULTZ, *executive editor*
bschultz@nww.com

STEVEN NELSON

Intranet is a supplement to *Network World* published by International Data Group of Boston. *Network World*, 161 Worcester Road, Framingham, MA 01701. Phone: (508) 875-6400, Fax: (508) 820-3467, E-mail: nwnews@nww.com.

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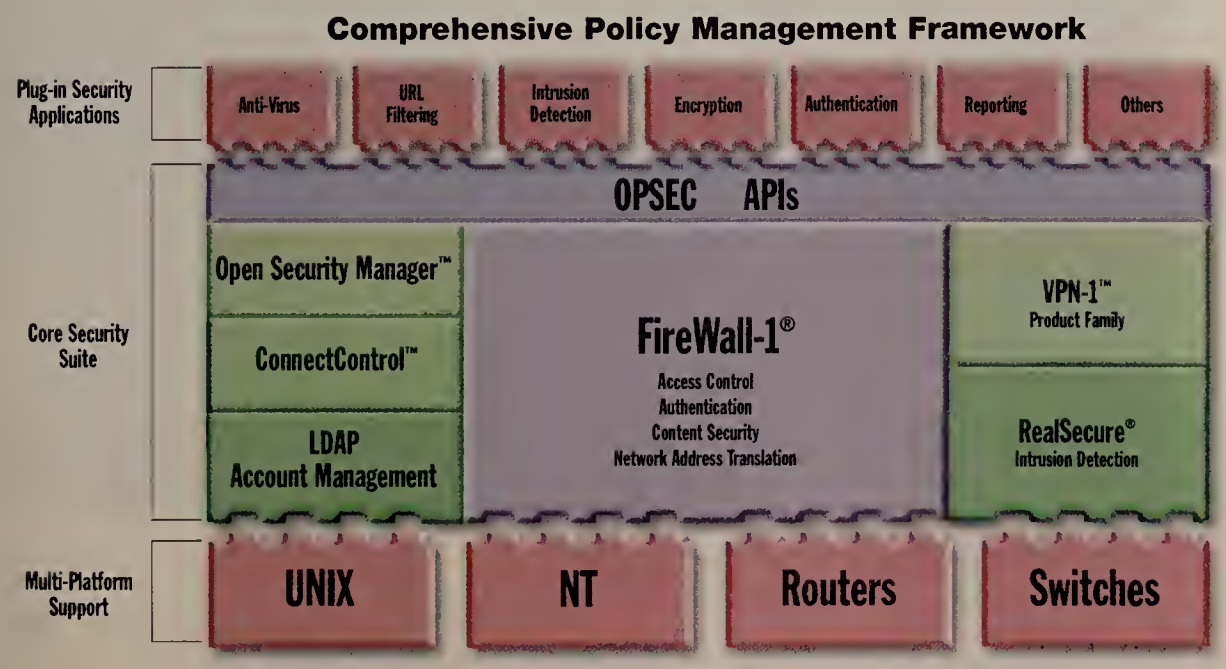

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The long road

MANY COMPANIES HAVE TAKEN THE EASY FIRST STEPS TOWARD INTEGRATING THEIR INTRANETS AND LEGACY SYSTEMS, BUT SOPHISTICATED WEB-TO-HOST APPLICATION DEVELOPMENT REQUIRES A COMMITTED JOURNEY. BY PEGGY WATT

As you log on to your intranet one morning, scrolling headlines announce Asia's latest currency crisis. Suddenly, a dialog box pops up: "One-quarter of your 401(k) investments are in foreign markets. Click for advice."

Should you be worried about your retirement funds? You keep reading to find out.

The human resources investment-watching agent notes that you're only 30 years old, so you can't even dig into the 401(k) cash for decades. You can click to see trends, follow another link for some what-if scenarios or request notification if the fund drops to a certain level.

The automated data retrieval has a different suggestion for your 58-year-old co-worker. Her HR dialog box reads: "Divest quickly — one-quarter of your retirement funds are riding an Asian roller coaster!"

Consultant Shel Holtz likes to use this example to illustrate that legacy data is far from lifeless storage and that putting a browser front end on the host doesn't simply mean letting users point and click through files. Combining the versatility and smarts of a Web applet with a host's vast resources can generate intelligent, innovative business applications, says Holtz, principal with Holtz Communication & Technology in Concord, Calif.

Holtz's scenario is pretty far down the road for most companies. But then again, just about everyone has taken the first steps by using browser interfaces most traditional host access vendors now provide.

While these upgrades satisfy users' first needs, host access developers are preparing and releasing next-generation Web-to-legacy programs. These more sophisticated tools allow greater customization and tighter integration, and pave the way for "Webifying" the mission-critical applications that almost always involve legacy systems, be they mid-range computers, mainframes or even high-end Unix machines.

Taking a step at a time to Webify legacy systems is fine with many IT shops, including that of The United States Corporation Co. (CSC). Its IT department is gradually moving data off legacy systems in favor of Web applications for customers and employees.

"Our legacy order-processing system has served the company well, but it's not the future," says Andrew George, application development director at CSC, which provides legal services and resources for major law firms and corporate attorneys.

TOM WHITE

Customers can retrieve materials, some of which are stored in a Unix Oracle database, through a password-protected extranet called Client Spot. Now CSC is testing Web-to-legacy functions.

From Client Spot, users will be able to place and check orders for legal research and documents and monitor invoices. Some information is in a 20-year-old legacy Business Basic program; some is in an Oracle 7.3 database running on a Sequent Unix server.

The Oracle Web server sends PL/SQL script

The long road *continues on page 10*

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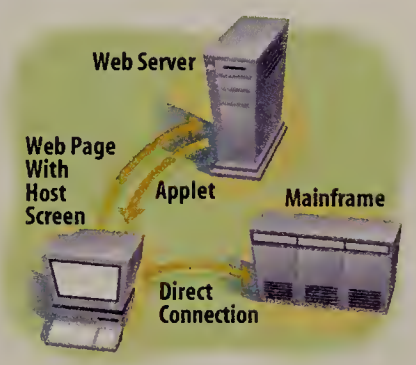

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e-business

WHAT'S THE DIFFERENCE BETWEEN A LITTLE KID WITH A WEB SITE AND A MAJOR CORPORATION WITH ONE? NOTHING. THAT'S THE PROBLEM.

Building a publishing-only Web site is the first step to becoming an e-business. A step that most businesses (and a lot of little kids) have already taken. That's fine as far as it goes – it's a very cost-efficient way to distribute basic information.

But the real payoff (for businesses, at least) comes with steps two and three. Step two is moving to "self-service" Web sites – where customers can do things like check the status of an account or trace a package online.

Step three is moving to transaction-based Web sites – not just buying and selling, but all processes that require a dynamic and interactive flow of information.

IBM has already helped thousands of companies use the Web to make the leap from being a business with a Web site to being an e-business – putting their core processes online to improve service, cut costs or to actually sell things.

For example, we helped Charles Schwab Web-enable their brokerage systems for online trading and customer service. Since opening, Schwab's Web service has generated over one million online accounts totaling over $68 billion in assets.

e-business economics are compelling. According to a recent Booz-Allen & Hamilton study, a traditional bank transaction costs $1.07; the same transaction over the Web costs about 1¢. A traditional airline ticket costs $8 to process; an e-ticket costs just $1. Customers love the convenience; management loves the lower costs.

IBM solutions have already helped thousands of businesses become e-businesses. To find out how IBM can help you do the same, bookmark www.ibm.com/e-business or call us today at 1 800 IBM 7080, extension NC32.

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The long road *continued from page 6*

queries to the Oracle database, which identifies transactions that go to the legacy database. The IT team wrote scripts that let the Business Basic program call an Oracle form. When a user requests information, Oracle scripts generate an HTML page with the answers, which may come from several data sources.

Automated billing services will free CSC's client service staff to handle tasks that are not so easily automated, George says. A customer who needs tax forms for three states can retrieve them from the World Wide Web instead of faxing or phoning for delivery. But one who needs to determine the filings and forms necessary to begin a corporate merger involving several jurisdictions will call customer service.

Like CSC, most companies that have begun integration efforts are really just getting started on what inevitably will turn out to be a long march. Along the way, they'll encounter obstacles such as bandwidth bottlenecks, integrity, reliability and security.

Early on, though, they'll be able to show some quick savings. Webifying order-entry systems cuts down on the need for costly manual order taking and data entry, for example. Customer service applications are also logical early projects that can reduce corporate spending.

Kanebridge, an Oakland, N.J., distributor of industrial fasteners, launched its Web-to-legacy integration by building a self-service extranet for customers. The company is gradually moving its inventory and accounting data off a Digital Equipment legacy system and onto an Oracle database on a Sun Solaris platform. "Thank goodness for the Web interface," says Jim Kierstead, Kanebridge's IS manager. "It absolutely gives new life to our legacy data."

Kierstead's team installed ISG Navigator, middleware from International Software Group that communicates with the data repository using Open Database Connectivity drivers. ISG Navigator sends data into OLE components managed by the Oracle database. Kanebridge's Web server is a Microsoft Internet Information Server running on Windows NT.

Kanebridge's new applications dynamically create and update Microsoft Active Server pages showing account balances and order status. In the six months since the application went up, daily hits have grown from 20 to about 200. Kierstead estimates about 8% of Kanebridge's customers use the site now. He expects a rise to 30% in the next two years.

In addition, employees and some customers are testing an order-entry system that interfaces with the Oracle database. Kierstead hopes to nearly eliminate repetitive data entry by encouraging customers to place orders through the Web.

Kanebridge has boosted its IT budget about 15% in the past year for Web-to-legacy projects, Kierstead says. The company expects the automation will save 20% of its customer service expenses and enable it to serve more customers with the same staff.

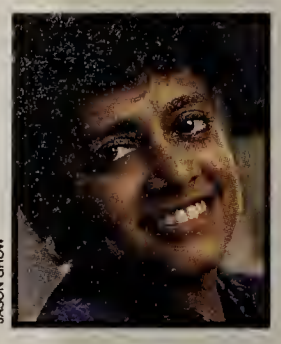
New York broker Quick & Reilly saw a payoff nine months after installing its first Web-to-host application, which replaces leased lines at remote sites with mainframe access via an extranet. It's seeing about a 20% reduction in branch operating costs, says Marc West, vice president of IT services at the firm.

And some companies that blaze a new trail on their road to legacy integration find ways to offer new services and generate revenue.

Fujitsu PC in Milpitas, Calif., built a business and profit center this summer when it began selling refurbished laptops on its Web site. Inventory lists, orders, credit verification and shipping are automated, and all operations interface with Fujitsu PC's legacy Oracle databases, which are on Sun servers running Solaris. The databases also feed an Oracle enterprise resource planning (ERP) system.

The company already has recouped its investment, says Usha Sekar, chief information officer at Fujitsu PC.

Along the way...



JASON GROW

"Doing business online is just a different way of selling, but it brings up other issues. For example, you can't just halt everything to take inventory periodically. Online, you're selling continuously."

USHA SEKAR, CIO, Fujitsu PC

ANDY WASHNICK

"Our legacy system is quite big, so to make a huge transition all at once would be tough. But while we do it incrementally, we don't want to sacrifice integration because all our systems share data."

JIM KIERSTEAD, IS manager, Kanebridge

JOHN RAE

"Our goal is to Webify all legacy data. Our plan is to find a way to use a common API to extract data from all these systems. What we're really building is a heavy-duty transaction processing system."

FRED KAUBER, director of Internet and e-commerce solutions, Reliance Group Holdings

JOHN RAE

"It's like a Hollywood sound stage that looks great on one side. We started by putting a nice face on our legacy system, but eventually we will transition to a new back end."

ANDREW GEORGE, application development director, CSC

SOON, A WORN TRAIL

A lot of companies are investing in the tools needed to provide host data over intranets, extranets and Web sites, says Steven Drake, a research analyst with International Data Corp. in Framingham, Mass. IDC's recent study of 500 large U.S. and European companies found that 46% have budgeted projects to Webify host access for intranets, and 40% are developing host access options for their public Web sites.

Web-to-legacy projects prove the critical-mass principle. Because so many legacy applications deal with order entry and payment, billing, recording payments and so on, by nature they involve business partners and customers. When one of those participants automates part of that process with a Web-to-legacy architecture, it pulls in the others. And customers who find they like conducting transactions online may pester their other vendors to install similar applications.

"Today, whenever people are thinking about communicating with any remote constituency, they think of the Internet," says Ashok Santhanam, CEO of Inventa, a Santa Clara, Calif., consulting firm that does almost all of its work on Web-to-legacy projects.

Santhanam encourages companies to think of Webifying legacy data not as an end in itself, but as part of a project that meets a business need. He also encourages companies to integrate not only with legacy systems, but also with ERP and sales force automation systems for greatest return.

"The intranet's value increases significantly when you add integration to legacy data," Santhanam says.

Once a company starts down the road, it can cover a lot of ground quickly. At reinsurance firm Reliance Group Holdings of New York, opening legacy data to browsers became a priority as soon as the intranet went up, says Fred Kauber, director of Internet and e-commerce solutions. "Once you're accessing legacy data through your intranet, you are really getting into the useful meaty apps that prove the worth of the investment," he says.

Reliance is testing several methods of Webifying its legacy data, which resides on a variety of IBM hosts. One way is to create meta-data repositories by extracting information from the mainframe to a Microsoft SQL Server database that can interface with a Web server. Another way is to let the browser directly access the legacy data. A third way is to install Web servers on the host systems so they handle all transactions.

Reliance uses the data-repository approach to build executive information systems on its intranet. Bluestone Software's Sapphire/Web application server is middleware and deploys repository data to a smaller data mart, a SQL Server database under Windows NT. The SQL database feeds information to a Netscape Web server. The common Web interface can display data from several sources, without users knowing the figures come from different databases.

On its extranet, Reliance provides HTML forms that its brokers can complete to request information or apply for policies. Data is stored temporarily on the Web server. A middleware script checks periodically for transactions, then sweeps them into the mainframe-based vertical application that manages contracts.

Santhanam believes availability of legacy data via the Internet will eventually change business as significantly as did the industrial revolution. Companies can create new lines of business and new jobs, he says.

They can also generate excitement. "This organization has been enlivened by the success we've had on the Web," says CSC's George. A 27-year customer recently told him, "The first 20 years of dealing with you were about the same. The last seven have been very interesting!" •

Get the most from your host

AN UNDERSTANDING OF THE VARIOUS WEB-TO-HOST ACCESS SCHEMES CAN LEAD TO A SMOOTH PATHWAY BETWEEN YOUR COMPANY INTRANET AND SNA DATA CENTER. BY ANURA GURUGÉ

TOM WHITE

Nearly every company that runs a mainframe or has large networked AS/400 minicomputers now has an intranet, and many firms are exploring the possibilities of using Web technology to support electronic commerce, customer service and remote access. But few companies have integrated their intranets and data centers, despite the fact that up to 70% of vital corporate data and many mission-critical applications still reside on a mainframe or AS/400.

Not that integrating an intranet and a data center has been all that easy.

Many host-resident mission-critical applications, typically developed 15 years ago, only work in SNA mode. The nearest you can come to making these applications TCP/IP-compatible is to use them in conjunction with a host-resident or off-board tn3270(E) or tn5250 server that performs standard SNA-to-TCP/IP protocol conversion. Otherwise, you'd have to rewrite the applications to work in TCP/IP mode. And that wouldn't be too feasible. The cost and effort of doing so for the $20 trillion installed base of SNA applications would make Year 2000 tribulations appear trivial!

You could allow access to some host data via an Open Database Connectivity scheme, but you'd still need an SNA application to get at other data, especially if it is stored on flat files or nonrelational databases. In other instances, data makes sense only when combined with the business logic embedded within an SNA application.

And let's not forget the large installed base of legacy devices that come with mission-critical SNA applications. You just can't do away with all those IBM 4700 financial systems, automated teller machines and control units overnight.

A Web-to-legacy access scheme needs to accommodate a variety of clients. The mix might include coaxial-attached 3270/5250 terminals, minicomputers, SNA applications that use LU 6.2 or LU-LU Session Type 0 protocols, SNA-to-LAN gateways and legacy control units. But a typical environment also might include PCs, Unix workstations, and printers that only work in TCP/IP mode.

This means that, in addition to the SNA transport technologies you'll need for SNA-only devices, you'll have to factor in SNA access technologies for TCP/IP clients. For access, be prepared to consider:

• ip3270/ip5250. Some PC SNA emulators and SNA-to-LAN gateways offer proprietary encapsulation schemes for conveying 3270/5250 datastreams within TCP/IP.

• tn3270(E)/tn5250. TCP/IP clients conforming to this Internet Engineering Task Force standard can access SNA applications via tn3270(E) or tn5250 servers.

• Browser access with 3270/5250-to-HTML conversion. In this scheme, a server-resident SNA-to-Web gateway converts a 3270/5250 datastream to HTML and rejuvenates the user interface so SNA applications can be accessed from a browser.

• Browser-invoked Java or ActiveX applets. These downloadable applets provide 3270/5250 emulation directly or in conjunction with an SNA-to-Web gateway. The applets can be cached on a PC hard drive instead of downloaded. Some also can provide user interface rejuvenation.

• Application-specific Web-to-data center gateways such as IBM's CICS Web Interface and Interlink's ActiveCICX.

• Middleware servers such as IBM's MQSeries, Bluestone's Sapphire/Web and Blue Lobster's Stingray.

WEB-TO-LEGACY PARTS

Picking among seven SNA access solutions is tough, but having so many choices also is worth exploiting. You can tailor effective and pragmatic configurations in which you employ different access technologies depending on the requirements of the end user and whether the access is across an intranet or the Internet.

Besides a Web browser and server, here are the SNA access-related components that you may need in order to integrate an intranet and a data center. The components are grouped where appropriate into functional classes:

• Client software, including a full-function, 3270/5250 emulator for ip3270 or ip5250; a tn3270(E) or tn5250 client; a terminal and printer emulation applet; a middleware client; and a tiny keyboard support applet used by some 3270-to-HTML conversion tools.

• A TCP/IP-to-SNA gateway. This could be an

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Go online for more information on integrating intranets and data centers, including:
▌A sidebar on SNA transport technologies.
▌Architectural schematics.
▌Access recommendations by device.
DocFinder: 9403

SNA-to-LAN gateway for ip3270/ip5250 on a PC server or a channel-attached controller, or a tn3270(E) or tn5250 server on a PC server, bridge/router, channel-attached controller or a mainframe.

• An SNA-to-Web gateway to augment an applet's functionality or to provide security. Examples include Attachmate's HostView Server and OpenConnect Systems' OC://WebConnect Pro. Such a gateway typically resides on a Windows NT or Unix server, although OpenConnect has a version that runs on a mainframe.

• A 3270-to-HTML or 5250-to-HTML gateway.

• An application-specific Web gateway such as IBM's CICS Internet Gateway.

• A middleware server, required for certain programmatic access schemes.

LEGACY ACCESS FOR EVERYBODY

Use this guide to help figure out which of the legacy access solutions best suits your needs.

Intranet users	First-phase access	Second-phase access
Clerks, customer service representatives or others doing basic data entry	tn3270(E) client	Browser with tn3270(E) emulation
Programmers and other power users	ip3270 client	ip3270 client
Senior managers running queries, e-mail and online calendaring	Ip3270 client	Browser with GUI rejuvenation; middleware server
User who needs mainframe access less than two hours daily	tn3270(E) client	Browser with GUI rejuvenation; middleware server
User who needs mainframe access more than two hours daily	ip3270 client	Browser with GUI rejuvenation; possibly a middleware server
Telecommuters, mobile users	Browser access from the Internet	
An agent working for the company	Browser access from the Internet; tn3270(E) emulation through a cached applet	Browser access from the Internet; GUI rejuvenation with either an applet or 3270-to-HTML conversion

Internet queries	Access solution
Simple	Browser access with 3270-to-HTML conversion
Insecure, multistep query	Browser access with 3270-to-HTML conversion and some form of screen sequencing
Secure, multistep transaction	Browser-invoked applet with rejuvenation

BROWSER VS. APPLET ACCESS

Of the seven access techniques, ip3270/ip5250 and tn3270(E)/tn5250 represent the old guard. They are well-known host access schemes used by more than 20 million users.

The new guard took post in late 1995, when 3270-to-HTML conversion made browser access to SNA applications possible. With HTML being the native language for creating Web pages, converting a 3270 datastream to HTML and vice versa was the obvious, logical and most straightforward way to Web-enable SNA applications.

Because most people call Web site and page creation "Web publishing," 3270-to-HTML conversion is known as host publishing. This can be seen in product names such as Attachmate's HostPublishing System, Farabi's HostFront Publishing, Novell's HostPublisher and IBM's Host Publisher.

3270-to-HTML conversion offers two advantages over green-on-black applet emulation. First, it requires only a browser — any browser — at the client. Second, 3270-to-HTML conversion always delivers at least some user interface rejuvenation or automatic graphical user interface. For example, it provides background and Web page-like trench input fields. What's more, extensive rejuvenation is possible, usually with the aid of visual programming tools such as JavaScript, JScript or Microsoft's Active Server Page technology.

These advantages make 3270-to-HTML conversion ideally suited to allowing casual access to mainframe or AS/400 applications. You could allow users to determine a package's delivery status, for example. Not having to download an applet would expedite the access process, while the rejuvenation capabilities will protect the innocent from the brutalities of the green-on-black screens.

Because the early products didn't effectively handle requirements such as session integrity, end-to-end persistence, file transfer and support for function keys, 3270-to-HTML conversion used to get short shrift. To be fair, some of these limitations were due to shortcomings of the browser or the HTTP protocol, not the 3270-to-HTML products themselves. Nonetheless, vendors such as Novell and Eicon have gone to great lengths to work around these limitations.

For example, Novell's IntranetWare HostPublisher now can circumvent most of the horrors related to the fact that 3270-to-HTML solutions don't offer end-to-end persistent connections. It uses session IDs, screen sequence numbers, timeouts and unique session name validation to do so.

Applet access is advantageous in that it provides a near complete green-on-black tn3270(E)/tn5250 emulation scheme replete with TCP-based, end-to-end persistent connections via a thin client. In addition, it promises the possibility of user interface rejuvenation via drag-and-drop tools, Java APIs, rules-based systems or Visual Café-type applet programming.

What's more, the latest browser versions permit caching of Java and ActiveX applets on a PC's hard disk. With cached applets, the browser queries the Web server to determine if a newer version of an invoked applet exists. If one does, the user is given the option of downloading it.

Users invoke an emulation applet by clicking on a designated Web page button, much as they do for 3270-to-HTML conversion. Most applets only perform tn3270(E) or tn5250 client emulation, but it's worth noting that Wall Data's Cyberprise Host Pro also works with SNA-to-LAN gateways.

Early SNA access applets tended to use Java. But now some vendors, including Attachmate, Farabi and Wall Data, offer ActiveX applets, too.

Most of the applets open a separate window rather than deliver an emulation screen as a pane inside a browser window. This means the browser is not locked into an SNA session, as is the case with 3270-to-HTML conversion. Note, however, that the applet relies on a virtual machine provided by the browser. This means the applet window will be abruptly and unceremoniously terminated if the host browser is closed. Theoretically, you could eliminate this browser dependence by converting an SNA access applet to run as an application on a virtual machine provided by the operating system.

Oftentimes, this type of host access scheme requires an SNA-to-Web gateway between the applet and the tn3270(E)/tn5250 server. Security is the overriding rationale — a gateway provides a spot for authentication and encryption.

In fact, if your applet scheme doesn't include an intermediary server component, you need to use a virtual private network or other auxiliary security measure. This will change when end-to-end encryption is added to the tn3270(E) standard.

BROWSER ACCESS VIA 3270-TO-HTML CONVERSION

Pros

- Only requires a browser at the client.
- Works with any browser and on any client machine that can run a browser.
- Facilitates and forces user interface rejuvenation.
- Can exploit any standard, server-to-browser security schemes, including SSL Version 3.0.
- Relatively simple, cost-effective solution that can be easily implemented on a PC server.
- Ideal for letting Internet users gain casual access to SNA applications.

Cons

- Most solutions don't support function keys and light pens.
- Doesn't support SNA-specific printing or file transfer.
- Can't deal with unsolicited screens from an application.
- Implementation-specific schemes for ensuring data integrity, session security and rejuvenation schemes.
- Forces users who require concurrent access to SNA applications and other Web information to open multiple browser windows.
- Some solutions only support a few hundred concurrent SNA sessions per server.

BROWSER ACCESS USING APPLETS

Pros

- Emulation compares to tn3270(E)/tn5250 clients.
- Minimizes software distribution and maintenance cost and effort.
- Applets can be cached.
- Applet window can run alongside the browser window.
- End-to-end persistent connections ensure data integrity and session security.
- Encryption is possible when using an SNA-to-Web gateway.
- Java applets facilitate cross-platform portability.

Cons

- Rejuvenation only possible with some tools.
- Must have SNA-to-Web gateway for encryption.
- Applet downloads can cause delays.
- Most tools only support Java applets.
- Implementation-specific rejuvenation schemes.
- May not work with Version 3 and earlier browsers.

The bottom line on Web-to-legacy integration: Technology is not a barrier, but you can't let the overabundance of product choice distract you.

Gurugé is a consultant specializing in internetworking and IBM network architectures. He can be reached at (603) 279-5596 or aguruge@mcimail.com.

Legacy lessons

HERE'S A LOOK AT HOW THREE COMPANIES HAVE HANDLED THE NEED TO GIVE EMPLOYEES, BUSINESS PARTNERS AND CUSTOMERS BROWSER ACCESS TO LEGACY DATA.

TOM WHITE

PG&E weathers Web integration

JASON GROW

PG&E'S Paddock

The first Web-to-legacy application developed by Pacific Gas and Electric (PG&E) was a classic case of good timing during bad weather.

The El Nino storms that battered the West Coast last winter kept power company crews busy, but IS held their own. Just a few months earlier, the company had put a Java front end on an outage tracking system that monitors power service for the 4.4 million PG&E customers scattered across 70,000 square miles.

Outage PC went online in 1995 as a client/server system with limited staff access and was reborn in late 1996 as an intranet tool called Outage PC-Web. It is a data-viewing and ad hoc reporting tool that monitors power outage reports. The Java upgrade in spring 1997 added a map view to the application's text reports.

Development took only about two weeks for two full-time staff members and probably the same amount of work hours over the past six months for improvements, Paddock says.

Data for the outage tracker resides in several legacy systems, including IBM mainframes, minicomputers and even a Windows NT machine, housed in various Bay Area data centers. Customer service representatives input most of the data.

"Previously, we had to go to a number of various systems and extract the information. This puts it in one spot, and Java makes it easy for all levels of users to access," says Harold Paddock, supervisor of NT applications at PG&E in San Francisco.

The data makes a quick but dramatic journey to browsers. Users activate a Java applet when they click on the Outage PC-Web page. The Java applet communicates with an information server PG&E built to act as a mainframe transaction server. The information server, Allaire's Cold Fusion Application Server, a Microsoft SQL Server and a Microsoft Internet Information Server reside on a Windows NT machine.

When users query the Outage program, they activate Cold Fusion tags, or scripts, written into the Web page's HTML. The Cold Fusion Application Server then queries the SQL Server database, which is fed by the information server.

PG&E staff wrote the information server as a modular C++ program and built it into the Java interface last year. The information server mimics a 3270 client when it queries the legacy systems. It parses the answers and writes the data as a flat file for the SQL Server, which sends the information back to the Cold Fusion Application Server. The Cold Fusion tags dynamically generate the data on the Web page.

Information server also reconciles all the outage reports, and refreshes the SQL Server every three minutes. From the user viewpoint, the map view also is updated every three minutes; the text report is refreshed manually for easy printing, Paddock says. Anyone with access to PG&E's intranet can view the data.

"We really put this application through its paces during El Nino, but it stayed stable," says Paddock, adding, however, that his team did free up disk space for the SQL Server data because outage and repair information grew during the stormy winter months.

Paddock notes that the Outage tool page is still the most frequently hit site on the intranet. He estimates that, at it's peak, Outage PC-Web garnered up to 53% of all hits.

Now other Web-to-legacy projects are popping up at PG&E because so much vital data is in mainframes and browsers are becoming a standard desktop interface at the utility company, Paddock says.

"I look at Web to host not because it's slick but as an intranet application, where I can wrap a lot of functions into one interface," Paddock says. "The user should have no idea that the information he received came from six different hoses."

— *Peggy Watt*

Insuring a Web future

JOHN HAROUAIL

NN FINANCIAL'S Hope

Canadian insurer NN Financial hopes to secure its future by giving brokers browser access to mainframe-resident records.

Until this project, the 5,000 independent brokers dealing with NN Financial products were a step removed from customer data. If brokers needed client information, they headed to the nearest of the firm's 80 agency offices.

Cutting out the middleman will make it a whole lot easier for brokers to do business with NN Financial, says Jeremy Hope, senior network communications analyst at the Toronto firm. But bringing all those brokers directly onto NN Financial's frame relay WAN would have been far too costly. The Internet provided an attractive alternative.

In the first part of a three-phase strategy, NN Financial gave brokers copies of Netscape's Navigator 4.04 browser with IBM's Host On-Demand 2.03 software. Host On-Demand, a secure Java applet, delivers brokers a standard 3270 screen to view and, to some degree, update client data. From the site, brokers also can check the status of commissions.

The Host On-Demand software sits on top of a Lotus Domino Web server, which the firm uses exclusively for this project — extranet and intranet traffic don't mingle. Logons determine which client data a broker can access; the legacy system handles security.

Since February, the company has given the Web software to about 300 brokers. Soon it will deploy the application to about 50 brokers per month, eventually Webifying its 3,500 most active brokers, Hope says.

At this stage, brokers can view only a client's life insurance information. In Phase 2, set to begin in March 1999, brokers will be able to view a client's entire portfolio.

To enable this, NN Financial must move legacy data from the mainframe to a more flexible database. It won't migrate the data, but it instead will use IBM's MQSeries to move data between the mainframe and a separate Oracle database. "We'll really end up with two data repositories, and we'll provide real-time updates between them," Hope notes. "More and more, the mainframe system is becoming like a file server at the back end."

The brokers will add an Oracle applet to their browsers in order to gain Web access to client portfolios. Hope expects the brokers using Host On-Demand will take this option, bringing the Web applications further into their firms. Individual brokers will pick whatever application best suits their needs — a quick look at a client address is fine through the 3270 screen while a more comprehensive view of a client portfolio calls for the Oracle application.

Ultimately, NN Financial plans to offer brokers a distributed database they can actually use to run their businesses. Brokers would install the database software locally and use it to house NN Financial-related information and any other client data.

"These are fully independent brokers, but obviously the easier we make it for them, the more business they might do with us," Hope says. "Others are going the same route, but most don't allow multiple company data yet."

When all is finished, brokers will have multiple Web-based solutions, Hope says. Which one they take advantage of will depend entirely on them.

— *Beth Schultz*

Gimme an extranet


STEVEN NIEDORF
TORO'S Love

Any golf aficionado will tell you there's no greater pleasure than stepping out onto a closely cropped green and looking out over a perfectly landscaped fairway — short of sinking a hole in one, of course.

The Toro Co., which has been in the business of providing outdoor landscape products for more than eight decades, wants to make sure golfers keep seeing those visions of loveliness. Believe it or not, Web-to-legacy integration plays into the company's mission.

For the past two years, the Bloomington, Minn., company has given customers access to legacy data via their Web browsers. Its Internet plan dates to May 1996, when it acquired a systems integration and help desk firm targeted at the golf course market. That company, Integration Control Systems and Services (ICSS) had brought about 4,500 golf courses online since 1988 when it began using the Internet to provide its help desk services, says Cindi Love, who owned ICSS and is now director of customer service systems at Toro.

Toro, with whom ICSS had a close relationship because of its golf course management equipment, took notice. Toro's goal in buying ICSS was not only to grow that existing golf course management business but also to launch similar efforts for its other product lines.

Six months after the acquisition, Love and her team launched the company's first extranet — Toro Electronic Community. Through the site, the 7,000 dealers of Toro's home lawn care products have access to the electronics parts catalogs and order-entry system, the service training manual, a store design module and ad planner software. To date, more than 1,200 dealers have registered on the site, Love says.

Since then, the team has brought up extranet sites for golf course superintendents using Toro products worldwide and its 150 master distributors. Sites are in the works for landscape contractors that use the company's equipment, and for service managers and contractors.

From these extranet sites, the respective Toro customers will have access to a range of functions, including order entry, product registration, invoicing, warranty claims and responses, and sales and inventory information. "Basically, everything we do on the front end with our customers is going to be running across an extranet and linking into our legacy system or SAP," Love says.

Toro is migrating customer front-end applications from its mainframe to a Web-enabled SAP R/3 system. The combined demand of mainframe connectivity and SAP integration made finding the right application development tool a challenge. But Love found one in the SegWay Suite of electronic commerce applications from Signal Internet Technologies in Pittsburgh, Pa. In Toro's case, the middleware acts as a data translator and access layer, providing a path between a Web server hosted at a US WEST switching center and the mainframe or SAP system.

Love also was attracted to the vendor's use of a rules-based engine. "We go to market in a lot of different ways, and we needed an engine that would be able to sort out who was coming into us, what their relationship was with Toro, their country, language, method of financing. There are literally hundreds of variables that have to be sorted out before they can place an actual order or get to product registration," she says.

Love could not say exactly how much Toro invested in its extranet projects, but she notes that bids from a request for proposal ranged from slightly less than $1 million to more than $8 million. "We chose on the lower end of the spectrum," says Love, adding that Toro also paid about $75,000 to bring up content and enable customers.

She's happy with the results. "We had a mainframe. It had never connected to a single user two years ago," Love says. "This year, we have had more than one million visitors to our extranets."

— *Beth Schultz*

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Go online for fuller versions of these case studies, as well as a look at how several other companies are tackling Web-to-legacy integration.
DocFinder: 9403

INTRAVERT

Putting a value on legacy corporate data

BY MARK GIBBS

Legacy data is a huge and, in many companies, largely untapped resource. So we have to consider the question: What is that data worth?

Thinking of legacy data in value terms is crucial. It costs plenty to acquire the data, so you can't afford to miss the opportunity of extracting as much value from it as possible. On the other hand, a crucial part of the challenge of extracting value from legacy data is not spending more on mining it than you'll get in return.

This is an area in which intranets are such an incredible opportunity. They provide an infrastructure not only for information presentation but also for information refining.

Take into account that some of your legacy data will be in forms usually considered hard to use in a computer environment. For example, those project records that now exist only on printouts are going to be tricky. Even a decent optical character recognition system will make enough transcription errors to reduce the potential value considerably.

Traditional thinking allows that the data inaccuracy would make the translation cost unacceptably high. But intranets change that. Take that inaccurate transcription and make it the index for images of the documents. These documents are now searchable, and if the search engine has a fuzzy match capability, misspellings caused by translation will have less impact.

When users run a search, the data returned consists of the related images. Here's where the intranet really becomes useful: Ensure the search terms are returned with the pages, perhaps as hidden fields, and users can check a box that says whether and to what degree the result matches their queries.

What you've done is capitalized on one of the great strengths of intranet publishing. That strength is the ability to integrate user feedback to improve content quality. You could even let users edit the transcription to correct errors.

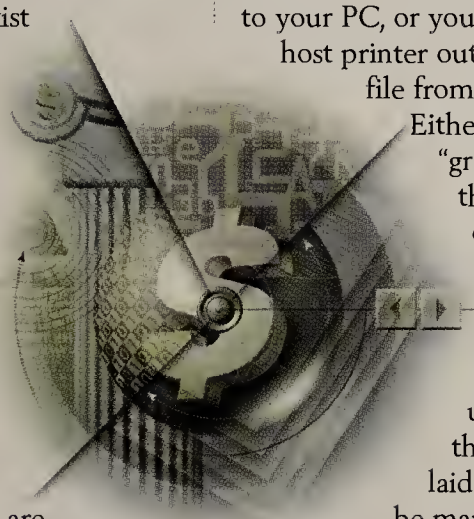
In this issue, we've focused on Web-to-host integration as a way of exploiting legacy data. However, moving the data into the intranet environment is appealing, too. If you migrate the data, it means you can eliminate complex searches and other services that slow host performance. How practical migration is depends on the data characteristics.

The data must not be too big. The data size issue is obvious — some legacy hosts are monsters, so duplicating the host storage on a PC or workstation would not be financially viable.

Another concern is that data not be bound too tightly to the legacy program. If it is, the program logic extracting information from the data is as valuable as the data. Extracting useful information requires the legacy software, and duplicating this logic may be too expensive.

If those concerns are issues for your data, then migrating the information in the form of host-generated reports rather than the raw data may be practical. Datawatch's Monarch Data Pump provides an interesting way to deal with the data-transfer problem.

Many legacy hosts produce some kind of file for printer output. You could transfer these files to your PC, or you could just plug the legacy host printer output into a PC and build a file from the captured print stream. Either way, you're capturing a "green bar" report, named for the paper used for host printer output.



Monarch Data Pump reads the file of captured data and builds a database. Once you've told the product what you want — how the green bar report should be laid out and how fields should be mapped to the target database — you can run the conversion so the data copied from the legacy host can be updated. If you run an index engine against the migrated data, you'll create a new source of information. This technique also allows you to merge data from multiple host sources.

And don't forget employees. They are strategically important legacy data resources. Employees have the skills and operational knowledge. If you could tap even part of that knowledge and relate it to other informational sources, the benefits could be fantastic.

Getting this resource onto the intranet mandates user publishing. If users are encouraged and even rewarded to articulate their jobs on the intranet, you'll be on track to creating a powerful business view.

Legacy-to-intranet integration should not be just about connecting to hosts; it should be about developing an electronic business vision. The value will be tremendous.

Gibbs can be reached at imcolumn@gibbs.com.

TOM WHITE

Java adds life to tn3270 clients

BY STEVE BLASS

Please step in and lie down, the doctor is in for consultations. As a network architect at Houston-based Sprint Paranet, Blass understands the strain of people who are developing and managing intranets. Send him your problems at dr.intranet@paranet.com.

We're considering our options for providing intranet users access to tn3270 mainframe applications. What's the role of Java?

As hard as I laughed the first time the notion of a Java tn3270 client struck me back in 1996, I sure wish I'd written a good one.

Java tn3270 client software brings us the one true ubiquitous point-and-click solution to all our tn3270 access needs. Other tn3270 browser packages provide exactly the same access that you get through a green-screen mainframe terminal except the fonts are proportional and the application will run in a window instead of using the entire screen.

ASK DR. INTRANET

The better Java 3270 and 6530 clients allow mouse control of cursor placement along with cut-and-paste capabilities and other features that can lead to some real productivity improvements in environments with large repetitive mainframe application screens. UniKix's Web Client package, for example, even incorporates audio prompting and point-and-click graphical menu capabilities.

How can I provide direct access from intranet applications to mainframe data?

In many cases, it's possible to use Java to communicate directly with External Call Interface (ECI)-enabled CICS applications by using the Common Object Request Broker Architecture. Existing products and development tools support SNA and non-SNA, binary, synchronous, mainframe connections. Software development tool kits are available for Java, ActiveX and even Visual Basic for programming ECI and External Presentation Interface to mainframe applications.

For ideas, check out the case studies at www.sna-inets.com, a Web site run by the SNA-Capable i*nets Forum, a group of software companies promoting the integration of Internet technologies with data centers. You can read how to access AS/400 SNA applications over the Internet, provide a Web interface to 3270 applications and display the output in Arabic, reduce a 30-screen mainframe application to three Web pages, provide Java applet access to tn3270E applications, and secure Internet/intranet access to mainframe applications while providing a rejuvenated graphical user interface.

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Briefs

■ *Document management and workflow vendor* **Keyfile** *of Nashua, N.H., last week announced it has* **acquired** *Burlington, Mass.-based* **F3 Software,** *which specializes in the creation and distribution of forms over the Internet. Terms of the deal were not announced. Melding F3's forms capabilities with Keyfile's workflow product, Keyflow, could reduce the reliance on paper-based forms by giving a wide range of workers an online alternative.*

✆ Keyfile: (603) 883-3800

■ **Netscape** *is releasing* **Netscape Security Services,** *a tool that will let software developers give their applications added Secure Sockets Layer 3.0 encryption and authentication support with certificate services. Netscape is charging $70,000 for the standard edition and $150,000 for the version certified under the government's Federal Information Processing Standard 140-1. Both versions of the security tool kit come with a royalty-free distribution arrangement.*

■ **Microsoft** *has released a* **software patch** *for Windows Explorer 4.01 that* **cures a key security gap.** *Without the patch, an attacker could read a file on a user's system. The hack requires that the victim visit the attacker's Web site where a certain scripting technique known as "Cuartango" has been used. Microsoft is urging users to download the software patch at www.microsoft.com/ie/security/paste.htm.*

Java backers say small is beautiful

By Chris Nerney

Listen to Sun CEO Scott McNealy at trade shows, and it's easy to conclude that Sun expects the real payoff for its Java programming language to come in the market for embedded consumer devices.

McNealy's standard stump speech depicts a future — nay, a present — in which embedded Java virtual machines turn home appliances such as telephones, stereos and automobiles into sophisticated computers, thus transforming any bearer of a Java ring into master of his own personal networked domain.

Sun's strategy makes sense: Forecasts for the embedded software market universally project huge growth in the consumer sector.

But Sun officials say embedded Java is more than just a consumer play. They say it has the ability to help companies extend their networks to include devices previously left out of the loop and in the process streamline supply-and-demand chain operations and gather vital market information.

The technology that will enable this is the recently released Java Embedded Server (JES), according to Jonathan Schwartz, director of enterprise products for Sun's Java Software division.

JES is a small application server that can reside on a variety of remote devices, including gas pumps, ATM machines, faxes, copiers, routers and switches, vending machines, manufacturing equipment and Web telephones.

Many such devices already have computers that respond to requests from users or determine what kind of dollar bills have been put in and how much change to return. However, these devices are generally isolated from the network, thus forcing companies to send out workers to perform routine maintenance, replenish inventory and upgrade features.

With JES, remote devices can upload, download, activate and deploy customized services and applications via the Internet, Schwartz says.

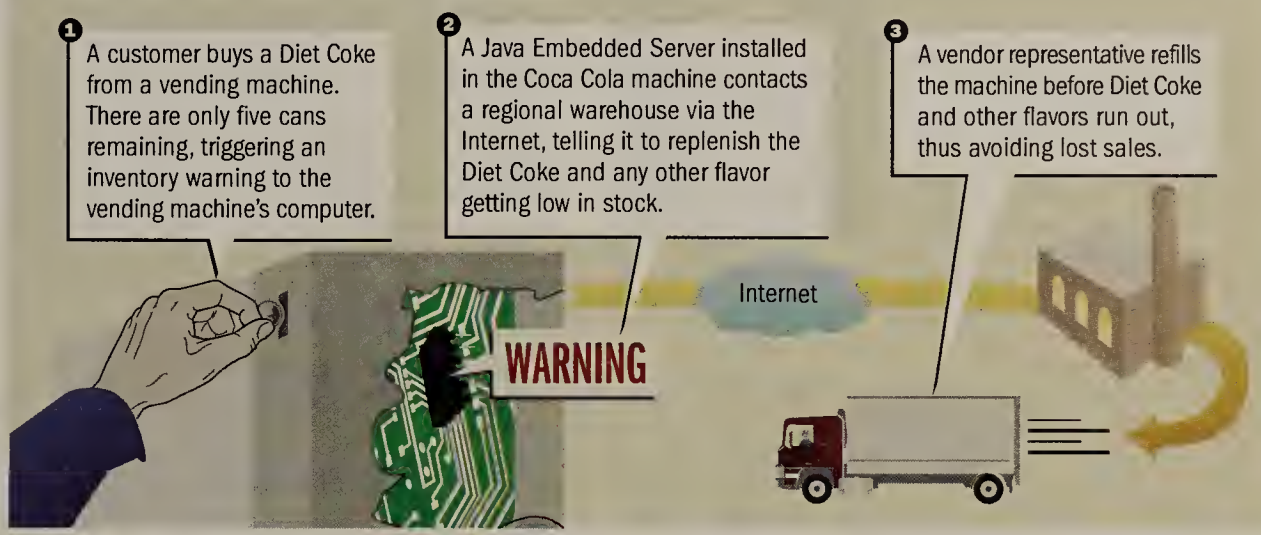
The JES architecture consists of two components: a JavaServer Engine comprised of APIs for control of plug-and-play services and applications; and the JavaServer Services, which the JavaServer Engine invokes and manages. JES is configurable by OEMs, vendors and customers, ensuring flexibility as new services and applications are needed, Schwartz says.

Schwartz says JES is ideally suited for companies such as utilities, gasoline distributors,

See **Java,** *page 38*

HOW JAVA CAN KEEP THE COKE FLOWING

Sun's Java Embedded Server is designed to allow remote devices previously not connected to the network to communicate needs with the home office.



Load balancers playing with firewalls

By Robin Schreier Hohman
Mahwah, N.J.

Load balancing is being pushed to the very edge of the network with FireProof from RadWare, a product that distributes incoming traffic among firewalls, greatly increasing throughput at the point of entry.

FireProof *links multiple firewalls.*

FireProof sits between the router and both software- and hardware-based firewalls, and serves as a traffic cop for all data flowing into the LAN. If the first firewall fails, all traffic is automatically rerouted to the standby box. However, FireProof enables users to tap into a redundant firewall, which while needed for failover, usually sits unused waiting in standby mode.

A firewall load balancer works like a server load balancer. The load balancer monitors the health of the server or, in this case, the firewall and sends traffic alternately to each box. If one firewall fails, the load balancer completely redirects the traffic around the failed box. If the load balancer fails, it is simply bypassed and traffic is sent from the router directly to one of the firewalls.

One difference, though, is the layer at which FireProof and server load balancers operate. FireProof balances the load at Layer 2 using the media access control addresses so it doesn't interfere with the IP addressing scheme of routers. Server load balancers use Layer 3 IP addresses.

The FireProof box also lets you — reportedly for the first time — integrate firewalls from multiple vendors because each firewall is attached to the FireProof box. Without FireProof, you have to use the same vendor to create a hot-standby firewall, company officials claim.

FireProof starts at $6,500 for a two-port Ethernet model. The top-tier box has four Fast Ethernet ports and sells for $14,000. There are also two- and four-port Ethernet and Fast Ethernet configurations. All models are shipping now. The company expects to ship a box with Gigabit Ethernet ports some time next year. ■

Get more online:

- **Technical overviews of the applications mentioned here.**
- **A page of Java primers and tutorials.**

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In-Site

Blockbuster deals hammered out on Web

By Ellen Messmer
New York

In the old days, PNC Bank would put together a multimillion dollar financing deal for a client with a Rolodex and a fax machine.

Today, the Pittsburgh corporate bank does its best work on the World Wide Web.

According to Chief Information Officer James Mikula, PNC uses the Web to post initial information and take questions from other investment firms interested in being part of the deal. As the deal takes shape, the bank and its investors move documents around with the help of a Lotus Notes-based workflow system, and the bank keeps the communication secure by having online partners digitally "sign" the most important files.

Interlink's Goldstein *is a Notes fan.*

All this is done with the help of IntraLinks, a company that offers a private intranet service for the high-finance community. The service takes advantage of IntraLinks' various vertical online applications, such as Intra-Place, for the private-placement market.

"We're using it in our capital markets area, in one of our largest products, loan syndication," says Mikula, who claims PNC has now completed over $2 billion in eight separate financing projects on behalf of its clients — all by using the Web.

While dozens of investment firms might get involved online in each deal, the lead bank, known as the agent bank, is the only one that gets to see the entire spectrum of online activity unfold.

Mikula estimates a 15% savings by using the IntraLinks service as compared with paper-based handling of documents. This savings can add up to a staggering $10,000 or more during complex deals.

At least as important, PNC is also saving time, sometimes shaving weeks off a financing project. One PNC client, the University of Pittsburgh Health System, got its financing in less than one day when the banks involved used IntraLinks. According to Mikula, this let the health care provider lock in attractive finance rates.

IntraLinks' online applications are tailored to each type of deal — for instance, there's IntraMuni for the municipals market.

How it works

With IntraLinks, each participant in a deal gets access to an online prospectus posted on a private Web site, which is entered using an encrypted password and ID. Interested firms can post questions via e-mail. Everyone with online access can see the questions and related answers, along with supporting documents in Adobe Acrobat PDF files.

When investors are ready to commit funds to a financing deal, they are asked to digitally "sign" the most important documents using a browser-based digital certificate.

The documents are passed around based on workflow rules in Lotus Notes. "IntraLinks" service is built around the Domino server, with a Lotus Notes database, and we use the IBM security guidelines," says IntraLinks CIO Lenny Goldstein.

Each signed electronic document is stored as a "digital hash," which is kept with the equivalent of a digital notary, Reston, Va., Assurity Technologies. This way, all parties to the deal can prove the integrity of any signed electronic document by checking the "hash," a unique mathematical representation of the document and its signatures. This cryptographic technique prevents tampering with contents, Goldstein points out.

The IntraLinks Domino servers are housed at one of IBM's data facilities in Illinois, which provides round-the-clock monitoring. Backup is also provided through IBM sites in Canada and the U.K. ■

Java

Continued from page 37

retailers that rely heavily on vending machine sales — any firm that relies on workers to manually gather information from devices. "Internet-enabling things like vending machines and gasoline pumps not only makes it easier to service and upgrade them remotely, it also provides much higher quality customer data because it removes human error," he says. "It also makes supply-and-demand chain operations more efficient and less costly."

One analyst agrees. "Coca-Cola does a huge percentage of its business through vending machines," says Anne Thomas, senior consultant at Boston-based Patricia Seybold Group. "But Coke doesn't have information about what cans are sold through the vending machines because all the computer inside the vending machine can do is handle transactions. It can't communicate.

"JES allows you to connect that computer sitting in the vending machine to corporate systems," she says (see graphic, page 37). "So the machine can tell the distributor its precise inventory requirements if it needs more Diet Coke or more Sprite. That way the delivery drivers know what to put on their trucks."

Further, Thomas says, JES allows developers to write applications such as billing programs in Java so that the applications work on any JES-enabled device.

JES costs $3,500 for one developer's seat and $72,500 for a 25-seat license. ■

'NET INSIDER

The 'Net is not dead

Jon Postel died the other day. These are very hard words to write. The reality behind them is even harder. Jon was a friend, teacher, co-trustee, sage and guide. We mourn his passing and celebrate his having been. He left us far before his time, having accomplished far more than most people can know.

Jon was one of the fundamental reasons why the Internet works. He did not invent all the technology, but as the editor and arbiter of the Internet Engineering Task Force's (IETF) RFC publication series, he made sure that the descriptions of the technology were clear and precise. He did not invent the process of creating Internet standards, but he was a guide to those of us trying to understand and then document the process. These contributions, which would have formed a full legacy by themselves, are not the reason that it is hard to imagine the Internet of today developing without Jon.

Jon created the Internet technical management structure. He invented and then became the Internet Assigned Numbers Authority (IANA), or the Internet's technical bookkeeper. The IANA kept the lists and created the processes that ensure IP addresses are unique, domain names can be resolved and Internet applications can communicate. This is mundane work, but it is just the sort of thing that can cause a system to collapse if not done correctly.

Jon was the IANA for many years, but as it became clear the Internet was growing too fast for any one person to support on his own, Jon started to build an organization to perform these functions. The IANA for some years has been an organization, not an individual.

Scott Bradner

Over the past few years, Jon had been working out what he called an exit strategy. He felt the organization, which is now the IANA, needed to wean itself from U.S. government support and authority to become a stand-alone, public interest, nongovernmental organization. He felt the same way about the IP address, protocol number and domain name allocation processes.

Jon came up with a proposal to accomplish this separation based on the same system used by the IETF to process standards. That process consists of producing a series of draft proposals, with each succeeding draft modified in response to comments received. Jon's new proposal is known as the Internet Corporation for Assigned Names and Numbers (ICANN) and was submitted to the U.S. government shortly before Jon died. During this submission process, Jon was subjected to some of the most vitriolic personal attacks I've seen on any individual, and there were many times when it would have been rational for Jon to just walk away. But his strong sense of responsibility would not let him do that. This was not ego; Jon had built the Internet support functions and it would have been irresponsible not to ensure their continuation.

The ICANN plan is not Jon's legacy. However, we must work to complete the plan's realization, not to honor him, but because it is the right organization for our future.

Jon's legacy is an Internet whose support systems just work. Nevertheless, I shall miss him greatly.

Disclaimer: I knew Jon, Harvard did not; these are my remembrances.

Bradner is a consultant with Harvard University's University Information Systems. He can be reached at sob@harvard.edu.

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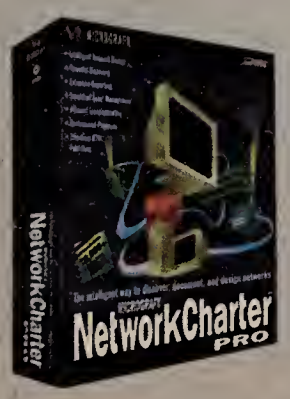

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My company is in the process of implementing a Windows NT Server network across eight states and approximately 27 offices. The board of directors recently handed down a directive that all hardware and software associated with the network must be Year 2000-compliant by year-end. Only recently did I become aware of the fact that NT 4.0 is not Year 2000-compliant. Calls to Microsoft and my integrator have not resulted in any dates I can use to make sure I will be in compliance with the directive. Do you have any further details?

Via the Internet

I called Microsoft and learned that Service Pack 4 will make Windows NT Server fully Year 2000-compliant. Microsoft expects to have Service Pack 4 available by the end of this month. (For more details, go to www.microsoft.com/technet topics/ycar2k/product/user_view 4555EN.htm.)

With the release of this service pack, you should start the planning and implementation cycle to ensure a successful rollout. By now, all your servers should be at Service Pack 3. If they aren't, document the level of the service pack currently installed on a per-system basis. You'll also need to review what hot fixes you've installed. Ensure that you have a good copy of the hot fixes readily available. Although each hot fix released since Service Pack 3 should be addressed in Service Pack 4, you may find that one hasn't, and that means you might have to reinstall the hot fix. You may want to pick one or more noncritical systems on which to initially install Service Pack 4 and watch these systems for any post-install problems.

Specification primes Gigabit Ethernet pump

By Doug Ruby

After two and a half years of painstaking committee work by some of the network industry's brightest lights, the IEEE in September ratified the 802.3z Gigabit Ethernet standard.

Network managers beset with data traffic jams now have a new class of simple, affordable high-performance switches, routers and servers that can be used in LAN backbones.

Networks can now move traffic at 1G bit/sec with an easy upgrade of their 100M bit/sec Fast Ethernet links. Network managers can make their 10M bit/sec Ethernet desktop connections 10 times faster with switched, full-duplex Fast Ethernet.

This new performance comes with a minimal amount of investment, pain, training and reconfiguration of existing hardware and applications. Gigabit Ethernet takes advantage of the frame size and format of other Ethernet varieties. It also takes advantage of the same applications, management tools, configuration, installation and troubleshooting procedures Ethernet network managers already use.

Gigabit Ethernet encompasses full-duplex media access control, and the classic carrier-sense multiple access with collision detection MAC. While most Gigabit Ethernet implementations will take advantage of the contention-free access and flexible topologies permitted by full-duplex operation, the 802.3z Gigabit Task Force decided to also extend the CSMA/CD MAC to work at 1G bit/sec.

The Gigabit Ethernet specification defines support for multimode fiber-optic links at distances up to 260 meters using 62.5-micron fiber and 550 meters using 50-micron fiber. The specification also defines longer distances using higher cost components, spanning 440 meters on 62.5-micron fiber, 550 meters on 50-micron fiber and up to three kilometers on single-mode fiber. In addition, 802.3z includes a specification for a transceiver technology referred to as 1000BASE-CX, which supports shielded copper cable spanning 25 meters.

The Gigabit Ethernet specification appropriates much technology from the ANSI Fibre Channel standard. In fact, it uses the same code set.

In addition to providing more bandwidth, the Gigabit Ethernet standard supports a new breed of products that can route traffic among different networks at gigabit wire speed — or 100 times faster than traditional software-based routers.

In fact, all of today's internetwork technologies are fully compatible with Gigabit Ethernet, just as they are with conventional Ethernet and Fast Ethernet.

Compatibility and bandwidth are essential, but what ultimately counts is what you can do with the technology. With Gigabit Ethernet, network managers can now accommodate servers and desktops running increasingly complex applications with bigger appetites for bandwidth. These include data-intensive applications in science, engineering and medicine. Bigger bandwidth also makes room for multimedia Web traffic, mixed media conferencing, video, voice over IP and distance learning.

Even with Gigabit Ethernet's inherent benefits, plus the ratification of the standard, choosing among the myriad Gigabit Ethernet products poses a challenge to network managers. When shopping for switches, uplink/downlink modules, network interface cards, routers, interfaces and buffered distributors, consider interoperability guarantees. Ask if the vendor participated in the Gigabit Ethernet Consortium's interoperability trials at the University of New Hampshire. Does the vendor certify its interoperability with other vendors' goods?

Also question whether the product is truely gigabit-scaled. Some vendors have tacked Gigabit Ethernet interfaces on switches and routers that were really designed to accommodate 10/100M bit/sec Ethernet nodes. You'll know these products by their aggregate switching capacity of 2G or 3G bit/sec.

For a sound network infrastructure, look instead for an industrial-strength box with an aggregate switching and routing capacity measured in multiples of 10G bit/sec and tens of millions of packets per second.

And beware of products introduced before early 1997, when an implementable draft standard first became available.

Network managers should also be aware of Gigabit Ethernet's limitations — chiefly that any link over 550 meters requires single-mode fiber, which may require upgrades to cabling infrastructure. This limitation isn't due to the optical power of Gigabit Ethernet, but to modal bandwidth, the nature of fiber optics.

Even as the industry ponders Gigabit Ethernet to the desktop over Category 5 unshielded twisted pair wiring, experts need to start looking at backbone connections measured in multiples of 10G bit/sec and a switching infrastructure capable of accommodating multiples of 100G bit/sec to handle bandwidth demands.

There is also a need to further look at optical technologies that extend Gigabit Ethernet links beyond the current limit of five kilometers and into the neighborhood of 100 kilometers, perhaps using Dense Wave Division Multiplexing. This advance would present compelling opportunities for metropolitan-area networks and WANs.

Ruby is vice president, product marketing, of Lucent's Enterprise Infrastructure Products Group in Concord, Mass. He can be reached at (980) 582-8500.

UP CLOSE

Gigabit Ethernet

The IEEE 802.3z Gigabit Task Force in September adopted a standard that defines how to build Ethernet products that support speeds up to 1G bit/sec while retaining the familiar management and communications characteristics of traditional Ethernet. The driving ideas behind Gigabit Ethernet products are to enable high-speed, low-cost networks.

Conforming to the Gigabit Ethernet standard means products must:

- Preserve the minimum and maximum frame size of the current IEEE 802.3 standard.
- Support the IEEE 802.3 Ethernet frame format.
- Provide simple forwarding between 10M bit/sec, 100M bit/sec and 1G bit/sec Ethernet.
- Provide a family of physical layer specifications that support a link distance of:
  - ▶ At least 500 meters on multimode fiber.
  - ▶ At least 25 meters on copper (100 meters preferred).
  - ▶ At least three kilometers on single-mode fiber.
- Utilize the CSMA/CD access method with support for at least one repeater/collision domain.
- Run at 1G bit/sec at the MAC service interface.
- Provide full- and half-duplex operation.
- Adopt flow control based on the IEEE 802.3x standard.
- Support star-wired topologies.

EDITORIAL *insights*

Getting it backwards

Two years, eight months and 25 days ago, Congress passed the Telecommunications Act of 1996. The telecom act said the regional Bell operating companies could and should enter the long-distance business. The act mentioned nothing about allowing them to merge.

So what's been the Federal Communications Commission's policy toward RBOCs? It rejects their long-distance applications and approves their mergers. Does that strike anyone as backwards?

The argument against letting RBOCs into long distance is that they haven't opened their local markets, as the law requires. But is that really true? There's now a group of competitive local exchange carriers (CLEC) that have broken into markets by reselling RBOC phone lines by the bushel — an inconvenient fact for the long-distance carriers' lobbyists, who go to comical lengths to keep the RBOCs out of long distance.

Recently, I've sat in these lobbyists' offices listening to them rant about "monopoly RBOCs." Yet sitting right in front of them are handouts bragging that their companies are local and long-distance carriers. AT&T and MCI WorldCom in fact have become both courtesy of their mergers. So how can the RBOCs be monopolies?

Perhaps the RBOCs haven't retaliated hard enough. They've submitted only five state applications for long-distance authority to the FCC in nearly three years. Two were from Louisiana and one was from South Carolina, neither a hotbed of CLEC activity.

Where are the long-distance applications from SBC Communications in California and Bell Atlantic in New York, where there's supposedly so much local competition? Maybe their priorities are elsewhere. Is it any accident that SBC and Bell Atlantic are the two Bells that have bought other Bells and are trying to merge again — SBC with Ameritech and Bell Atlantic with GTE?

Somehow the FCC has bought the line that mergers such as these give users something new. I don't see how. Even the original RBOCs were basically the result of mergers — seven companies formed out of Ma Bell's 22 local operating companies. When two RBOCs merge today, it just means that a larger collection of local calling areas is gathered under one parent company.

Perhaps the FCC should reverse its policy as much to refocus the RBOCs' energies as to follow the intent of Congress. If the FCC put its foot down on mergers, maybe the RBOCs would finally start competing — another thing they're supposed to be doing but aren't. A lot of things in telecom reform are complicated, but on these points, the law is clear: The RBOCs should do new things, not the same old, same old. Why not give the law a try?

David Rohde, senior editor drohde@nww.com

Operating Systems • Wayne Spivak

What a difference a year makes for Linux

Around this time last year, I wrote a column in which I cautioned readers not to dive into Linux. Unix, yes; Linux, no. To be specific, I said, "I'd go with a broadly supported Unix flavor that has technical support and a research and development department, such as BSDI [Berkeley Software Design, Inc.] Unix."

Now, one year later, Linux is all the rage. Novell and Caldera Systems, a firm started by former Novell CEO Ray Noorda, are working together to port Novell Directory Services (NDS) to Linux (*NW,* Oct. 12, page 1). Companies such as Oracle, Netscape, Corel, Computer Associates and Informix have announced support for the maverick operating system. Applix, Inc.'s ApplixWare office suite running on Red Hat's version of the Linux operating system offers a word processor, spreadsheet, presentation graphics, mail and HTML authoring software.

How is this newfound enthusiasm for Linux affecting the more traditional Unix vendors, such as BSDI, The Santa Cruz Operation (SCO) and Solaris? Is support still an issue? Would you now be better off choosing Linux rather than Unix?

Red Hat, which considers NT to be its main rival, is currently seeing a doubling of its business, with a projected 400,000 copies of its Linux operating system being sold this year. In addition to eroding NT's foothold, Red Hat sees Linux products usurping some of the more traditional Unix vendors' market share, which is clearly one of Caldera's goals. "Linux does a better job than SCO Unix, has better scalability and will run most applications written for SCO Unix without modifications," contends Ransom Love, Caldera's president and CEO.

In contrast, Kevin Rose, director of marketing for Unix vendor BSDI, says Linux has helped increase Unix sales. "The growth of Linux has paralleled the growth of our business, and we're glad Linux is succeeding," he says.

Market share gains notwithstanding, a perceived lack of support still dogs Linux. How do you sell the low-to-no-cost operating system to your boss when little or no vendor support exists?

Currently Red Hat offers not only e-mail-driven installation support, but also a whole commercial support program that is available worldwide, says company spokeswoman Melissa London. In addition, London says the company is creating a Red Hat certified engineer program as well as a new enterprise computing division geared toward commercial use of Linux.

Caldera offers free 30-day installation support by e-mail and a pay-as-you-go support plan with several options. In addition, the company is creating "training and certification courses to bring a common level of knowledge to all Caldera value-added resellers, who will support Linux worldwide," Love says.

Unix vendor BSDI continues to offer a technical response team that responds to all technical queries within a four-hour time frame. BSDI also has a consulting division to assist clients in the development or implementation of BSDI products. From programmers to systems operators, Rose says BSDI will offer support to its clients — for a fee.

Ultimately, when deciding whether to go with Unix or Linux, weigh the advantages and disadvantages of specific Unix and Linux vendors based on the features they offer, not on the support issue. The platforms are beginning to open, so more and more programs are available on all flavors of Unix and Linux. And the major Linux vendors have created a support environment that you can take to your boss. So if Linux is your choice for an operating system, go for it; the old arguments aren't valid anymore.

Linux, as that old cigarette advertisement said, "You've come a long way, baby."

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Send letters to nwnews@nww.com or John Gallant, editor in chief, Network World, 161 Worcester Road, Framingham, MA 01701. Please include phone number and address for verification

Evading Big Brother

Regarding your article "Keeping an eye on e-mail" (Oct. 5, page 1):

My company has been monitoring e-mail for a while, and it is a useless cost issue for us. Why? As soon as employees found out that they were being monitored, they all went out and got rocketmail, hotmail and now Yahoo e-mail accounts. They are smart enough to know the Web-based e-mail can't be monitored under normal means because it looks just like a regular HTTP file.

Companies afraid of this should just remove e-mail, FTP,

A sure foundation for policy management

Like FTP Software and other TCP/IP stack vendors before it, independent vendors of IP management products have essentially disappeared from the market. Earlier this month, Lucent snapped up the last major player, Quadritek Systems. Lucent's move came a mere day after Cisco consummated its deal to acquire American Internet Corp. (AIC). Not one for long courtships, Cisco announced an OEM relationship with AIC this spring and by August declared its intentions to buy the company.

Both Quadritek and AIC have products that allow users to control IP address and name assignments using the Dynamic Host Configuration Protocol (DHCP) and Domain Name System (DNS). DHCP lets workstations get their IP addresses, nearest-router address and other key IP information automatically from a central server instead of through local manual entry. DNS specifies a hierarchical naming scheme for TCP/IP networks as well as a scheme for mapping names to IP addresses.

Just as it was inevitable that TCP/IP would become integral to operating systems, it was inevitable that IP management would be wed to the network's physical infrastructure. Without that marriage, policy management can't work.

IP management services are truly a foundation technology for policy-based management. They enable the policy system to find individual devices on the network and tell the devices what to do — for example, the policy system can tell an Ethernet switch to take accounting's SAP R/3 packets and flip them into the high-priority queue. In order to provide services such as bandwidth allocation, traffic prioritization and security, network vendors need the ability to bind IP addresses to users.

Quadritek, AIC and the former Isotro Network Management (now part of Bay Networks, which itself was recently acquired by Nortel Networks) developed the distributed IP management services that support that binding. All three offer products that can tie into directory services via the Lightweight Directory Access Protocol (LDAP). (Only Bay Networks has yet to ship this feature.) And for users who haven't yet deployed LDAP-based directory services, policies can be based on DNS names or logical groupings of IP addresses. In light of the relatively small base of directory customers, the ability to base policies on DNS names and IP address groups is critical. It's no wonder network vendors have been buying up IP management companies.

To its credit, Bay Networks was one of the first vendors to identify the need for IP management services to support its policy management plans. Bay Networks bought Canada-based Isotro in April 1997. This June, Bay Networks announced Version 4.0 of Isotro's NetID product, a key component of Bay Networks' recently announced Optivity Policy Services.

The AIC purchase is Cisco's second run at acquiring IP management services. Cisco wasted no time in branding AIC's products as its own and in June delivered Cisco Network Registrar 2.0. Customers with the older Cisco DNS/DHCP Manager are simply being upgraded to Network Registrar, which is a good deal for them. Network Registrar is the basis for user registration services for CiscoAssure, Cisco's implementation of policy management. You can see why Cisco felt compelled to own AIC. Lucent was smart to jump on the remaining major player. Companies that hesitated, such as 3Com, lost the opportunity to buy IP management expertise and must now grow it internally or partner with another vendor, such as Microsoft or Novell.

In the meantime, the scalability and robustness of the IP management services from Bay Networks, Cisco and Lucent will be tested as these vendors next year begin rolling out their policy-based management products. Early in 1999, Cisco expects to release CiscoAssure policy tools for quality of service and security, while Bay Networks' first release of its Optivity Policy Services, which focuses on application prioritization, is due in the second quarter.

Lucent will be telling its policy story in coming weeks and expects to have products by mid-1999. Off the bat, Quadritek's QIP IP name and address management software will integrate with the Remote Authentication Dial-In User Services Lucent got when it acquired remote access vendor Livingston Enterprises.

These policy applications will undoubtedly stress the underlying IP management services in new ways. Even as they evolve their IP management services, vendors will be busy fine-tuning the elaborate set of interactions between network gear, the IP management services and policy management applications. By late next year, it will become clear who's got an implementation that can meet the demands of the largest enterprise customers, ISPs and other network providers.

In the meantime, investigate the IP management services from your primary network vendor. Evaluate the flexibility the service gives you to distribute control of management functions, such as address assignment, around the organization; its redundancy and robustness to minimize downtime; and its scalability to accommodate the number of users you need to support. Also, be sure you're happy with the level of support and pace of development your vendor provides for its IP management services. With so much riding on this foundation, you want it to be as solid as possible.

Petrosky is an independent technology analyst in San Mateo, Calif. She can be reached at mary@mpetrosky.com.

HTTP and any other means of outside TCP/IP attachment from the users' disposal; there is no other way to stop it.
Randal Carpenter
Fountain Hill, Ark.

Master of disguise

Regarding your article "Microsoft and standards: The rules have changed" (Oct. 5, page 1):

I did beta-testing on DR-DOS 5.0 and saw firsthand the interesting ways that Microsoft played its games. When DR-DOS 6.0 was released, Digital Research had to issue a patch to get it to run with Windows 3.1. Both releases were technically more advanced and stable than MS-DOS.

I have evaluated many software programs and operating systems, and I have seen the escalation of Microsoft's underhandedness. Microsoft has become more canny and subtle at portraying the facade of a company that just wants to get along while it knowingly uses all of the power it can wield to bring smaller entities into its camp and under its thumb.

Of course, Microsoft can't set any standards without a significant amount of support from independent software vendors, OEMs and other channel companies. Nevertheless, we have all seen how people are afraid to say what they really know or have been involved with relating to Microsoft because they know what the repercussions will almost surely be.

Every company that has competed directly against or made a show of challenging Microsoft has been either forced out of business or has had to change its business direction. This occurs even with the companies with which Microsoft partners. Even though I'm no longer surprised, I must admit that I am still truly amazed at how those not in the trenches only "see through a glass darkly."
Loran Robison
CEO
Rasmussen Corp.
Ely, Nev.

Clinging to VINES

In his column "The alluring buzz, but oh, that sting" (Sept. 28, page 122), Mark Gibbs completely overlooks another rock-solid alternative to NT or NetWare: Banyan VINES.

You want directory services? VINES has had them from Day One. You can even purchase Banyan's StreetTalk for NT to give your NT server a real upgrade. You want robust? Some companies have VINES servers that have not been rebooted in months because there was no need. VINES is pretty much set and forget.

Banyan's documentation is excellent. Those seeking Microsoft Certified Software Engineer or Certified Novell Engineer certification would do well to attend the Certified Banyan Engineer classroom training, where the focus is, and has always been, on the enterprise rather than the LAN.
Kerry Nye
Network administrator
National Education Association
Jefferson City, Mo.

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PHIL FRANK AND JOE TROISE BABA@SFGATE.COM

AND A HISTORY OF BUSINESS CONNECTIVITY TO BACK IT UP.

Mention connectivity these days and you can't help but notice the enthusiasm of everyone eager to implement a VPN. And why not? Taking the promise of VPNs at face value, it would be hard to find a better way to ensure security, improve network connections, and increase throughput capacity, all while dramatically reducing your costs. You, however, need accountability, not promises. So which VPN provider do you put your faith in? Well, if history is any guide, it could only be Shiva. You see, connectivity has always been our business. So it's no wonder we have the world's largest installed base of VPN systems. In fact we're so confident in our solutions, we guarantee them. To learn more about the Shiva Guarantee, call 1-800-97-SHIVA or visit us at http://vpn.shiva.com. And don't forget to ask for your free copy of *Virtual Private Networking: Maximizing Network Performance While Reducing Costs* — an objective guide to key VPN issues with a case study that will show you why Shiva's is the only VPN that guarantees success.

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FEATURE

E-mail overload

Continued from page 1

So will the Internet come crashing down and collapse under the weight of e-mail's amazing success? The keepers of the Internet infrastructure are using improved protocols to handle the load. But ISPs, IS departments and e-mail users risk drowning if they don't devise strategies to cope with the torrent of messages.

Adding it up

Getting an overall view of the nation's e-mail load requires looking at a series of snapshots. America Online handles about 34 million messages per day for its 13 million subscribers, up from 17 million messages per day for 9.5 million subscribers a year ago. Two years ago, AOL handled about four million messages per day for about 6.5 million subscribers, according to a company spokeswoman. By comparison, the U.S. Postal Service handles about 293 million pieces of first class mail per day.

One private sector example of e-mail deluge is New York financial services firm Merrill Lynch. Its network handles 400,000 messages per day, says Crystal Henner, the firm's director of enterprise service delivery management. Merrill Lynch's e-mail load roughly doubles each year.

"E-mail has exploded over the past few years," says Lowell Gray, president of Eco Software, an ISP in Lynn, Mass. Some users receive several hundred e-mail messages per day, though in many cases much of that volume stems from e-mail discussion list traffic.

About 500 million e-mail messages are delivered to U.S. homes every day, according to a report by Forrester Research, a market research firm in Cambridge, Mass. A full 28% of U.S. homes are online, more than triple the 8% of homes that were wired two years ago. That explosive growth makes e-mail an attractive medium for direct marketers. The number of homes online will more than double again by 2002, while the number of messages received will triple.

The average office worker sends and receives 30 e-mail messages per day, according to a study on messaging commissioned by Pitney Bowes. The study also found that the average worker handles 52 telephone calls, 22 voice mail messages and 18 pieces of snail mail per day.

E-mail volume is a product of message size as much as quantity. The average piece of e-mail has gotten 10% to 30% fatter in the past year, says Durwin Sharp, a senior technology architect at Exxon in Houston. "People are adding all sorts of neat formatting and cutesy stuff into the mail messages."

No doubt about it, e-mail is an efficient way to communicate. The technology is cheap, easy to use and less intrusive than the telephone. It's become critical for sharing information among a workgroup, especially when members are in different locations and time zones, Sharp says.

Stuffed mailboxes

Not surprisingly, e-mail is weighing heavily on the network infrastructures that carry it. E-mail is accounting for increasing portions of IS budgets, which calls for changes in staffing and resource allocation.

"We've spent this year at least 12 times what we used to spend on e-mail," says Merrill Lynch's Henner, though she notes that e-mail still accounts for a relatively small portion of the total IS budget.

With a reasonable amount of planning, organizations can minimize the strain on their mail servers and networks. But managing e-mail on a personal level is a bit trickier: 60% of executives, managers and professionals, and 54% of all survey respondents polled in the Pitney Bowes study said it takes a lot of time to respond to the messages.

"You see full mailboxes, you see people working longer, you see people taking e-mail with them on trips, you see people taking e-mail home with them, you see people taking e-mail on vacation," says Exxon's Sharp. "I go on vacation with my machine because if I don't keep up with my e-mail, I'll never dig out."

E-mail overload is just one facet of a surplus of messaging in general, according to the Pitney Bowes study. Communication is becoming more important to most jobs, making employees busier and, ironically, harder to reach. Compounding the problem, people are generally dissatisfied with time-delayed communications, so they send more messages to convey information or initiate real-time communications.

As a result, workers are forced to reprioritize tasks and juggle their schedules to handle the messages. In fact, the daily goal for many workers has become simply to read and respond to all of their e-mail, the study reports.

"Everyone has a different way of working with e-mail, but I view my in-box as sacrosanct," says Doug Stumberger, a product manager on the Exchange server team at Microsoft in Redmond, Wash. "My in-box has become my way of organizing my work life. A lot of the things I have to do are cued off messages, so I will do anything I possibly can to move messages out of my in-box."

How to handle messages

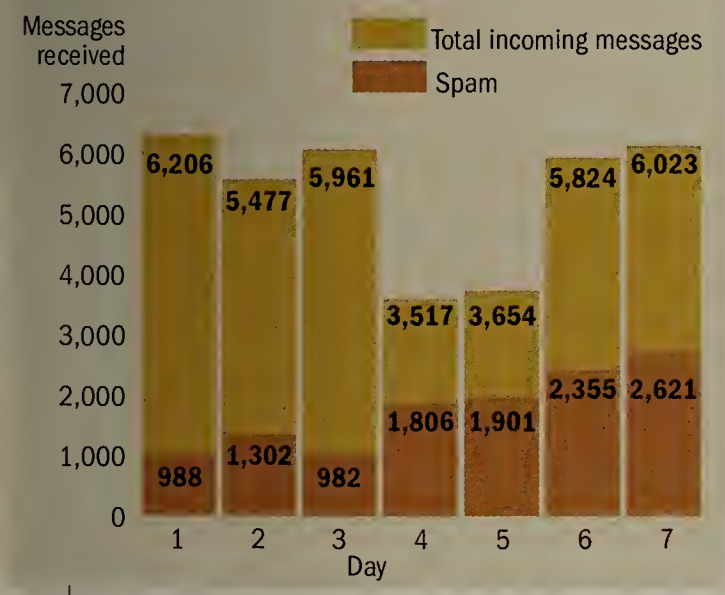
Tools that ease the process of sorting messages are showing up in major e-mail packages such as Microsoft's Outlook and Qualcomm's Eudora Pro. The tools include mailboxes or folders that serve as a hierarchical filing system for organizing messages, plus rules-based filtering options that let users set their e-mail programs to automatically sort, delete, reply to or forward messages based on a variety of attributes. Users can scan the first few lines of messages without opening them, or view their mailboxes in a variety of ways, such as displaying unread messages only.

SHAWN HENRY

Lowell Gray, *president of ISP Eco Software, says spam accounts for 90% of messages sent to his server.*

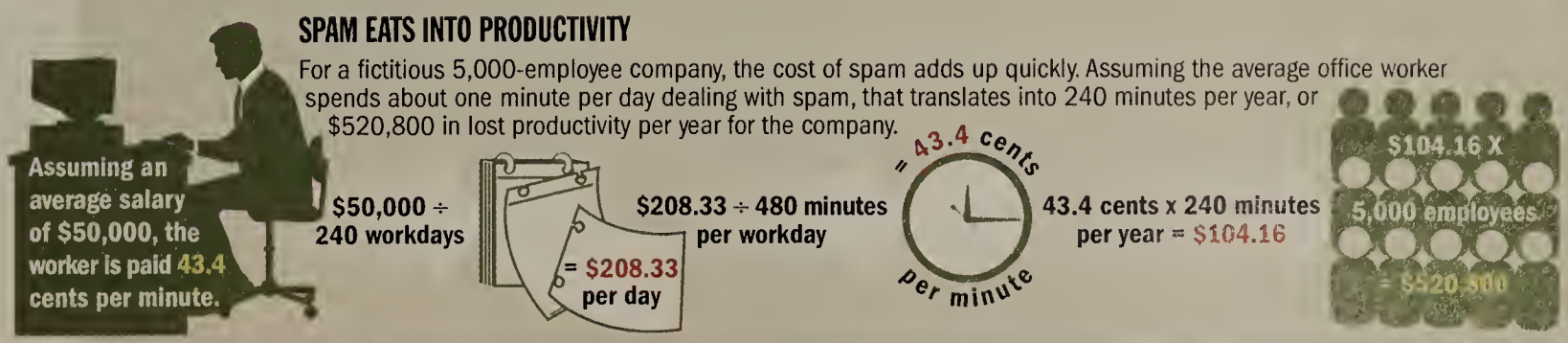
PORTRAIT OF A SPAM ATTACK

Internet of the Sandhills, a small ISP in Southern Pines, N.C., suffered a burst of spam that lasted several days in August. On the fourth and fifth days, the spam accounted for more than half of all incoming messages.



SPAM EATS INTO PRODUCTIVITY

For a fictitious 5,000-employee company, the cost of spam adds up quickly. Assuming the average office worker spends about one minute per day dealing with spam, that translates into 240 minutes per year, or $520,800 in lost productivity per year for the company.



But however mailboxes are sorted, senders want their messages eventually to be read.

"If somebody is out of the office frequently, it becomes a real problem because the person comes back with a full schedule and is faced with getting caught up with e-mail," says Joanne Moir, a compliance manager in the Boston office of Mellon Private Asset Management, the investment management services arm of Mellon Bank. Because she knows how time consuming e-mail can be, Moir uses return receipt for time-sensitive messages to determine when recipients have opened them, she says.

One problem with e-mail tools such as return receipt, however, is that users rarely spend the time it takes to configure them or even learn how to use them. "How many of the features in your mail program do you actually use?" asks Eric Zines, an analyst in the Dallas office of market research firm TeleChoice. "Most people probably use about 10% of the power that's available in their applications."

Handling the volume of e-mail is only one aspect of the overall problem. You don't need to be barraged with messages to feel overwhelmed — the content of the missives and the work they initiate are other important indicators of e-mail overload.

"You hear somebody say, 'I get 300 messages per day.' Well, I don't get anywhere near 300 messages per day, but many of the messages I get require detailed and relatively thoughtful responses," Exxon's Sharp says. "If I got 300 mail messages that require the average kind of response that some of mine require, that would be six months' worth of work right there."

The Pitney Bowes study recommends that users plan ahead to handle the deluge of e-mail, and block out time to read and respond to messages.

You can also help your colleagues by being more careful about how you use e-mail. For example, minimize repeated messages and only distribute messages to recipients who truly need to see them.

Return to sender

Adding to the e-mail overload problem is the simple fact that such an inexpensive, useful tool is attractive to all kinds of businesses, including spammers. "People are sending spam because it costs them nothing. Even if they annoy millions of people, if only a handful of them respond it's profitable," says Eco Software's Gray.

Broadly defined as unsolicited commercial e-mail, spam is already taking a toll on ISPs that spend time and money filtering out the bulk of it so their customers aren't overwhelmed. AOL's spam load ranges from 5% to 30%, according to a company spokeswoman. About 90% of the messages sent to Eco Software's servers are spam, Gray says. "Our customers would be outraged if that mail came through," he notes.

Nina Burns, CEO of Creative Networks, a market research firm in Palo Alto, Calif., conservatively estimates that the volume of spam doubles every year. "It's going to get worse before it gets better," she says.

Unlike ISPs, other businesses have been relatively successful in avoiding the worst of spam. Spam accounts for as little as 2% of e-mail received at several corporations. Although ISPs and corporate IS departments use much of the same firewall technology, companies have more control over their users' e-mail accounts.

"I don't want to go on record saying we don't get any spam because somebody will fix that," says an IS executive at a Fortune 100 company who requested anonymity. "I think part of our spam success is low visibility."

But given spam's exponential rise outside their corporate walls, IS managers are wise to fear its presence. ISPs have already seen what spam can do, and it's not pretty. At least three ISPs — AOL, Eco Software and Internet of the Sandhills — say they could lower the price of a basic Internet connection by $1 or $2 per month if they didn't have to contend with spam.

The price of spam

The most obvious cost of spam is the time it wastes. In the business world, time is money. "Any time you use up end-user time, you really start racking up the dollars," Burns says.

For example, if the average user wastes just one minute per day dealing with spam, a company with 5,000 employees who earn an average salary of $50,000 per year loses more than $500,000 per year in productivity (see graphic, page 45). There are also incremental IS-related costs: bandwidth, server hardware and labor. A burst of spam can disrupt or crash a mail server.

Server hijacking poses one of the costliest threats to its victims. If a mail server is set to allow the open relaying function of Simple Mail Transport Protocol (SMTP), anyone can forward e-mail through it and make it look as if messages originated there. This is how spammers can send out hundreds of thousands, if not millions, of unsavory messages while hiding their tracks and avoiding angry replies.

Not only will the mail server slow to a crawl during the attack, but bounce-backs from invalid addresses and irate replies from spam recipients also may keep the server and its administrator busy for days.

"There are probably hundreds of thousands of SMTP servers out there. If we got 99% of them to stop relaying, that still leaves thousands of SMTP servers out there that spammers can use," says Paul Hoffman, director of the Internet Mail Consortium (IMC). "I cannot imagine a day when there won't be enough open relays for today's level of spammers to continue or generate even more."

Declaring war on spam

Not surprisingly, a market for server and desktop e-mail filtering software is blossoming in the fertile soil generated by spam and e-mail overload.

Recent releases of mail server software such as Sendmail, a freeware implementation of SMTP, include antispam features. And end users can banish spam from their in-boxes by using one of the dozens of desktop spam filters with cutesy names such as MailJail and SpamEx.

There are also more powerful server filters such as Bright Light Technologies' BrightMail and Berkeley Software Design, Inc.'s BSDI MailFilter to keep spam in check. Bright Light and BSDI keep their filters up-to-date by using spam traps, which are dummy e-mail accounts that attract spam.

Filters identify traits that are common in spam delete messages or shunt them to a specific mailbox. For example, spam often uses fake return addresses, so one way to filter it is to search for invalid addresses in the return address field.

AN EXPENSIVE OUTAGE

A fictitious 5,000-employee company is hit by a spammer's relay attack, and one of the company's mail servers is knocked out of service for the better part of a day. The chart below shows that the company loses $7,317.64 in productivity for each hour the server is down.

	Senior managers	Professional staff	Clerical staff
Number of employees	100	3,000	1,900
Number affected by the outage	21	633	401
Average hourly wage	$83.64	$43.73	$17.7
Percentage of job function lost	12.9	19.9	23
Total loss per hour	**$226.59**	**$5,507.10**	**$1,583.95**

SOURCE: CREATIVE NETWORKS, PALO ALTO, CALIF.

HOW TO TAKE CONTROL OF YOUR E-MAIL IN-BOX

End users

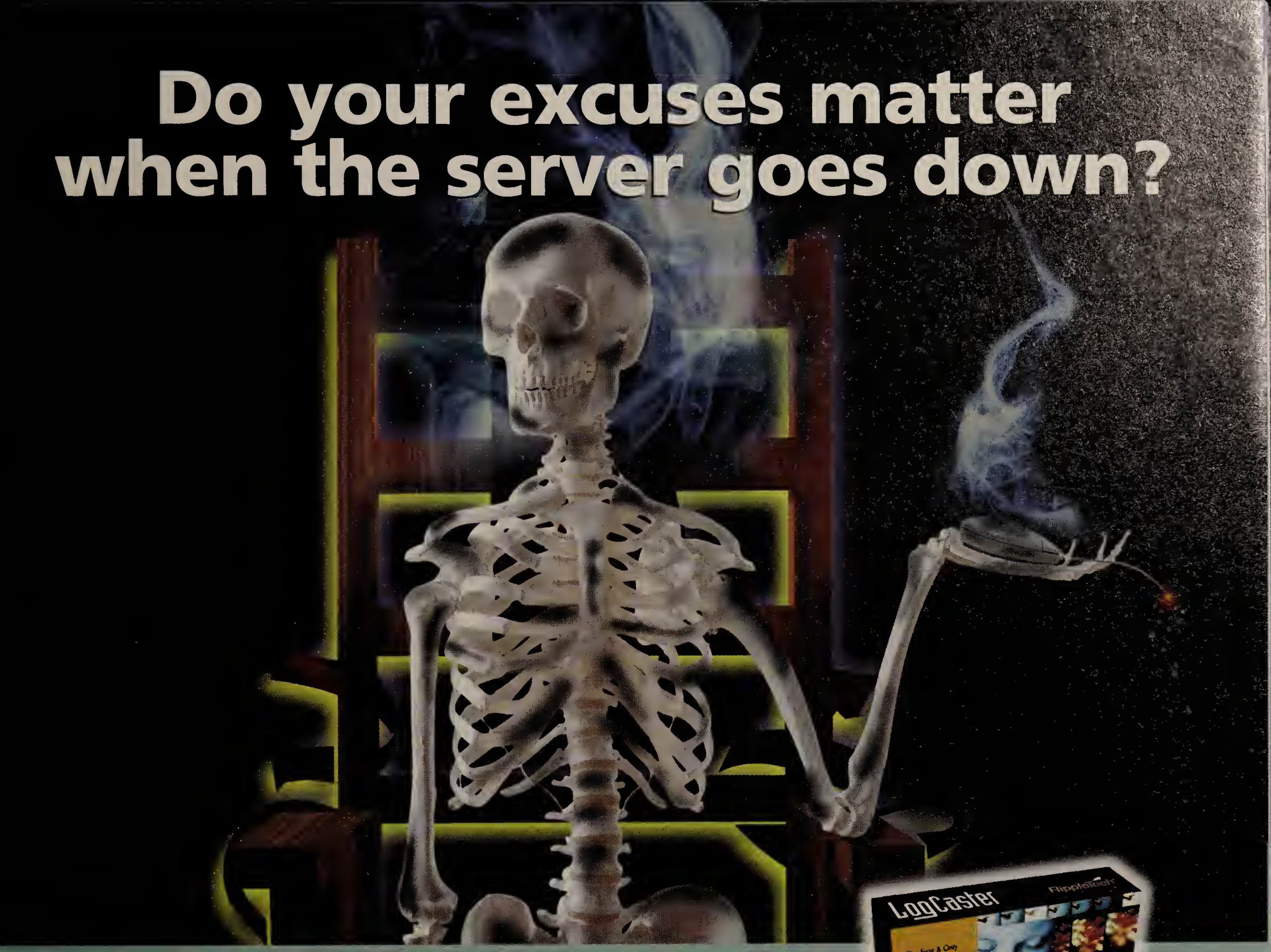
- Use the labels and folders in your e-mail client to sort and keep your in-box clear of all but the most important items.
- Set aside a specific time each day to read e-mail.
- Don't interrupt your workflow every time you receive a message.
- If you're receiving copied messages unnecessarily, ask to be removed from the distribution list.
- Augment server-based filtering with a desktop spam filter if you have the time to configure and update it. Never set filters to delete messages automatically. Set up a spam folder and periodically check it for messages that were mislabeled as spam.
- Consider using a second e-mail address from a free e-mail service to register on Web sites that might use or sell addresses for spamming.

IS managers

- Ensure that your SMTP servers are closed to open relaying.
- Keep your SMTP server software up-to-date.
- Use spam filters in Sendmail and your Internet firewall. If necessary, add dedicated spam filtering software.
- Spam filters become less effective over time, so make certain your vendor supplies you with frequent updates.
- Send the contents of your spam traps to filter vendors to help them track down new sources of spam.
- Make sure your company has clear policies about how employees can use e-mail. Warn workers about using their company e-mail addresses to sign on to Web sites that are not job-related. Also consider whether employee use of Usenet groups outweighs the risk of attracting spam.
- Press your e-mail software vendor to better integrate its product with other desktop productivity applications.
- Spell out your policies about selling e-mail addresses, and inform your clients or customers of the steps you take to protect them from spam.

— Kimberly Patch and Eric Smalley

Do your excuses matter when the server goes down?



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NOTHING BUT THE TRUTH.

Filtering is essentially the last line of defense in fighting spam, but it won't solve the problem by itself. "It's an arms race; it's guaranteed to fail in the end," says Adam Engst, publisher of "Tidbits," a newsletter in Seattle, and a spam filter developer. Filter users should recognize that some small percentage of the mail their filter catches will be legitimate e-mail.

"Despite all the work I've done on filters, I really don't believe spam is a technological problem. It's essentially a social problem," Engst says.

There ought to be a law

Social problems often require legal or regulatory solutions, and there are dozens of pending state and federal bills that address spam. The bills' agendas range from legitimizing spam to banning all forms of online unsolicited advertising.

Businesses are concerned that legislation could inhibit online direct marketing. "Let's not throw the baby out with the bath water," Microsoft's Stumberger says.

Many people are pointing to a recently passed Washington state law prohibiting spammers from using false return addresses as a model for federal legislation. "It doesn't get into all the really tricky issues with freedom of speech because it doesn't outlaw spam; it outlaws false and misleading spam," Engst says.

A California law passed last month makes it illegal for spammers to use other peoples' servers or domain names without permission, a move that introduces the risk of fines and jail time for spammers caught hijacking servers.

However, others are looking to business practices to ultimately resolve the spam problem. Raising the cost of spamming is one approach. If ISPs meter outgoing mail and charge people based on volume, users would have to pay for each message they send out, Eco Software's Gray says.

More online

- Tips on implementing mail filters.
- Links to spam-fighting resources.
- Info on legislation and litigation involving unsolicited bulk e-mail.

FIND IT ON FUSION 9122
www.nwfusion.com

A new kind of junk mail

An emerging combination of technology, market forces, and federal and state legislation will likely be enough to slay the dreaded beast. And once spam is controlled and the risk of being associated with it fades, a plethora of legitimate direct marketing companies will be eager to step in.

"The Direct Marketing Association wants to use direct e-mail advertising because it's spending tens of billions per year sending unsolicited postal mail," the IMC's Hoffman says. Even if ISPs create new e-mail pricing schemes, direct marketers will still save a bundle.

Not only is e-mail a less expensive way to reach customers, it offers greater interactivity and better incremental response rates to follow-up mailings, says Bill Herp, president of e-dialog, an online marketer in Lexington, Mass.

In the end, whatever it's called — e-mail direct marketing, junk e-mail or spam — the simple fact is that its volume will go up, not down. An evolution from pitches for get-rich-quick schemes and pornography to solicitations for mutual funds and laundry detergent may be of little comfort if the overall volume of e-mail you receive gets out of hand.

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REVIEW

SCO'S TARANTELLA LETS YOU RUN APPS ON DIVERSE PLATFORMS FROM WITHIN A BROWSER.

Spinning apps on the Webtop

By Rawn Shah

Want to run a Unix application? Then you need a Unix client, right? Not anymore. With Tarantella, The Santa Cruz Operation (SCO) offers an application delivery system for the large enterprise. Tarantella lets browser users run Unix applications on any supported platform from within a browser. We found Tarantella is simple to manage and fairly easy to use.

Tarantella is a cross-platform application broker; it acts as an intermediary between the servers in which the applications lie and the client station, providing a uniform access and management system for the applications that is independent of the server platform.

While you need no additional software on the client side, you have the option of installing SCO's native client software for all Windows platforms. Windows 3.x users will see much better performance from the native client software, but in 32-bit Windows 95, 98 and NT, there isn't a noticeable difference.

Net Results

Tarantella 1.2
The Santa Cruz Operation
(831) 425-7222
http://tarantella.sco.com
Price: $395 per user

PROS

- ▲ Works well with low-end and high-end clients
- ▲ Supports many different versions of Unix
- ▲ Great administration tool for large organizations and user bases

CONS

- ▼ NT applications require second tier of multiuser NT products such as Citrix's WinFrame or NCD's WinCenter
- ▼ Control Center application is clumsy to use

Organizing users and applications

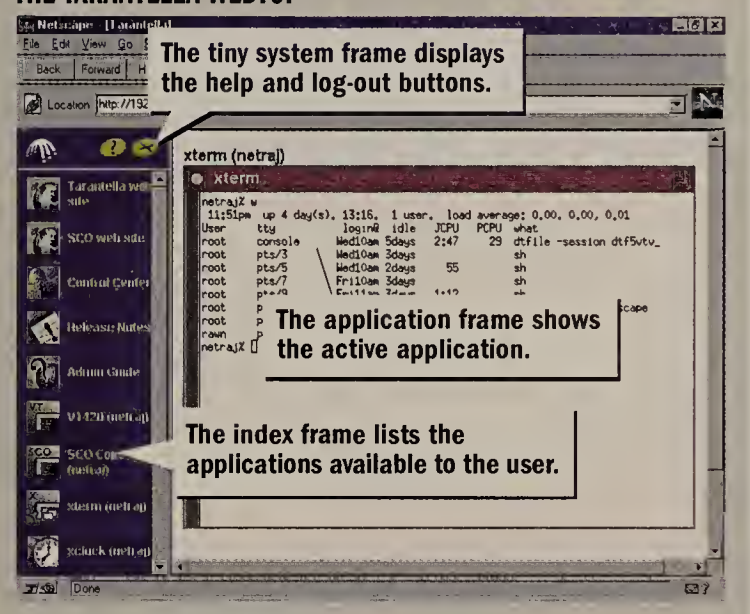
Tarantella is designed to handle the organizational complexities of a large corporation and its network. It allows you to define a hierarchical view of groups and users in the manner of a network directory service. Under the main Organization object, you create Organizational Units within which you can place users and their security level for Tarantella access and specify the applications presented to the groups and users. The hierarchical system lets you control application access by user or group, or across an entire organization.

When users log on, they see the Tarantella Webtop, a multiframe HTML page (see above graphic). The left frame shows the applications available to the entire organization, to the user's departmental group and those directly designated for the user, as configured by the administrator. This hierarchical system of application access allows the administrator to easily distribute applications to a large number of user Webtops while still maintaining fine control on a per-user level.

The large frame on the right of Tarantella's Webtop shows the application that is currently running. Applications do not have to run within the browser Webtop window and can be opened in separate browser or nonbrowser windows.

When you log on to the Tarantella server, the software notes that you're connected and have permission to run applications. You can leave the Tarantella page and go to a different URL or site, and still be able to return to your session. To quit Tarantella, you have to log out by clicking on an icon in the system frame. An administrator can also define an idle automatic log-out timer.

THE TARANTELLA WEBTOP



As an administrator, you can list any of the active logon and application sessions to the server. You can also suspend an application at any time. However, Tarantella lacks a performance meter to show application load on the server and network traffic load on the server's interface cards. It also would be helpful to identify all users running a particular application. The administrator should be able to suspend all users in a particular organizational unit or all users running a particular application. Furthermore, although you can suspend an application in use, you cannot terminate the application.

The default administrator is the root user on the Unix system. The administrator's view has a few extra icons in the index frame than a normal user. The most significant icon is for the Control Center, a Java applet for configuring and monitoring the Tarantella system. For a Java applet, Control Center is quite zippy, but we noticed the applet lost connectivity to the server in some cases if we clicked too many buttons too quickly.

The Webtop is customizable to reduce the amount of screen real estate not used by applications. For example, you can display the application icons without their descriptive names, leaving more space for the application window. You cannot, however, change the overall frame-based layout.

We had a couple gripes with Tarantella's user interface. First, there is no way to create multiple menu levels in the index frame. You can designate that an application is associated with a group, but rather

Score Card

	Administration (30%)	Performance (25%)	User interface (25%)	Installation (10%)	Documentation (10%)	Total score
Tarantella 1.2	6 x .30 = 1.80	6 x .25 = 1.50	7 x .25 = 1.75	7 x .10 = 0.70	8 x .10 = 0.80	6.55

Individual category scores are based on a scale of 1 to 10. **Percentages** are the weight given each category in determining the **total score.**

than display a single icon for all group applications in the index frame, Tarantella displays a list of all applications in each group. If users belong to many groups or if a group has a large number of applications, users may have to hunt through a long list to find the application they want.

Another problem we found was if you resize your browser, the main application frame restores to the default Welcome page. This was particularly annoying when we were in the Control Center applet in the middle of configuration and needed more viewing space.

Using the Webtop

From the user's point of view, applications are quick to load but are merely adequate in operation. An X terminal session running under Tarantella, for example, seems to scroll as slowly as if the program were running on a physical terminal connected at 9.6K bit/sec.

The client platform has little impact on application performance. We found no noticeable difference between application response on a 90-MHz Pentium PC or a 266-MHz Pentium II, though the 90-MHz Pentium took a few extra seconds to load the application.

Administrators can specify that applications are to be resumable. In that case, when a user launches an application, that instance continues running until the user exits from it or logs out of the session. Users can switch to other applications or even go to a different URL and still return to an application in the same state. This feature can help eliminate the delay of launching an application again.

SCO plans to add access to NT systems to Tarantella by year-end. You can access NT applications today only if you use an additional multiuser NT server such as Network Computing Devices' WinCenter. Essentially, WinCenter allows you to access NT applications using an X Windows client. Because Tarantella can launch X client applications, you can run your NT applications as well. However, this backdoor approach is a little too roundabout to be practical.

Tarantella doesn't require network directory services such as Novell Directory Services, Banyan's StreetTalk or Microsoft's forthcoming Active Directory Service. This could be viewed as a strength and a weakness. The product offers a self-contained hierarchical management system. On the other hand, if you already have such a system in place, Tarantella can't tie in and take advantage of it, meaning you have to duplicate your organizational structure and maintain it in two places.

Finally, at $395 per user, we think Tarantella's cost is higher than it should be.

Tarantella is a good start to providing a secure and manageable multiplatform application access system for your intranet or extranet. Its performance is unexceptional, but its organizational capabilities put it a step ahead of products such as Microsoft Windows Terminal Server and the Sun JavaStation and Netra J.

Shah is an independent network consultant in Tucson, Ariz. He can be reached at rawn@rtd.com.

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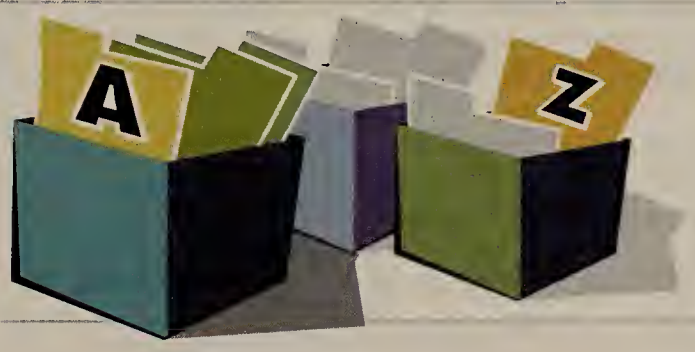

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Remember when telephone manufacturers in the early '80s built telephones into everything from alarm clocks to microwave ovens? Well, they're at it again but with a '90's twist. Introducing the Casio PhoneMate IT-380 E-Mail Link Telephone, a phone that can automatically dial your e-mail provider and download your incoming e-mail.

Actually, you don't get your entire e-mail message. You get only the subject line, and only its first 60 characters.

Why would you want a phone that can do this? Well, chances are that *you* wouldn't because you live and die by your e-mail. But it might be good for your Luddite cousin who gets one or two e-mail messages per week and doesn't want to be bothered going to the computer to download them unless he knows one is urgent.

There's one problem though: The technically challenged caller may have some problems programming the phone. Initially, you have to enter a service provider phone number, name and password; an e-mail provider name and password; and the IP address of a Domain Name System server. That's pretty confusing for the consumers for which the phone aims.

Quick takes on high-tech toys by Test Center Director **Lee Schlesinger**

You program the phone by pressing buttons, guided by setup menus displayed on the LCD screen. It's not a complicated system, but it's time-consuming and error-fraught.

You can program the phone to check for e-mail each day at a specified time, and you can program two different e-mail addresses, which you must check one at a time. If the phone finds e-mail waiting, a big green alert indicator on the front panel flashes.

When it fails to successfully retrieve messages, the phone displays a numeric error code, which is not at all helpful. The manual points you to the company's Web page, where the error messages are listed. Hold on a minute, I thought. If I had a computer to view the World Wide Web, I wouldn't need a phone to check my e-mail.

Error messages stay on the screen for only a few seconds. If you're checking e-mail automatically and you don't happen to notice there's an error, there's no way to tell whether you have a faulty connection or you just aren't getting any e-mail. Your e-mail could be piling up without you knowing it.

The telephone hardware itself is rather good. Still, if you're looking for the right gift for someone you want to drag into the Internet age, *AOL for Dummies* might be a better choice.

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Management Strategies

Cracking cybercrime

Don't touch electronic evidence until you call in the cops or a cyberforensics expert.

By Deborah Radcliff

Early this year, the audit manager for a financial services company suspected a former employee of embezzling nearly a million dollars. He took the suspect's PC to his office to analyze its hard drive, then got called out of town. Unaware of the investigation, his trusty assistant reissued the suspect computer to the word processing pool to replace a broken one.

"That guy's evidence — and his case — was toast," says Michael Anderson, former IRS investigator and founder of New Technologies (NTI), a cyberforensics firm in Gresham, Ore. "All the ambient data was overwritten." Earlier, the audit manager had considered outsourcing the forensics work to NTI but decided to forego the $215-per-hour fee and do it himself.

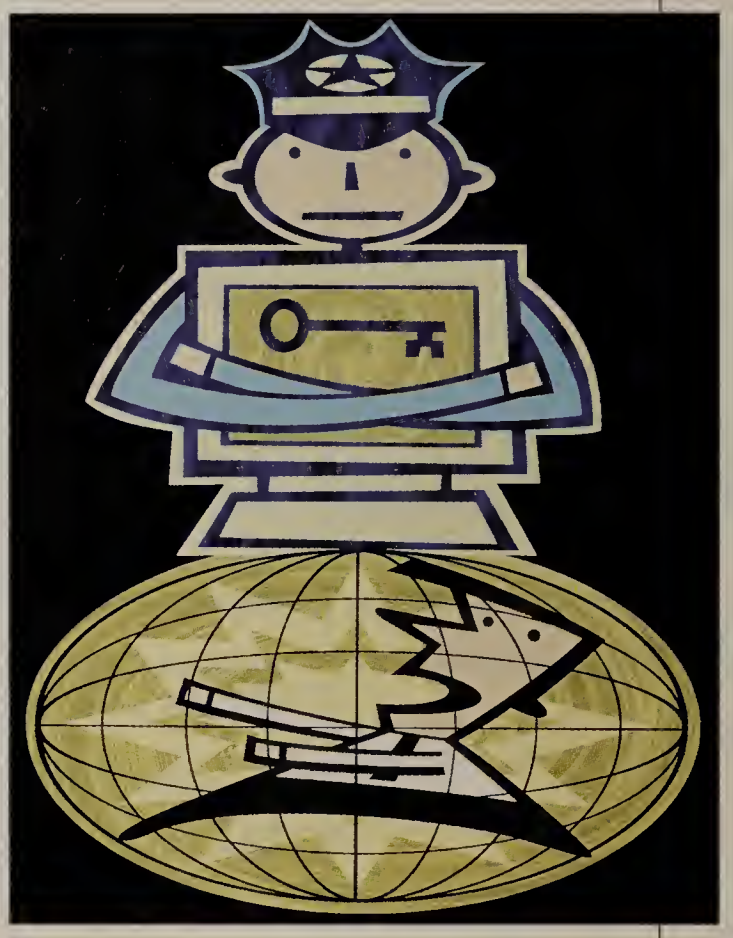
There's a lesson here: Thou shalt not bungle computer evidence intended for a court of law.

Crimes committed via computer leave distinct evidence trails. If you so much as access, download or open suspect files, you could taint the evidence and render it inadmissible. That type of activity alters backup files and system logs and overwrites date and time stamps, says Bill Boni, director of IS for PriceWaterhouseCoopers in New York.

Draft a contingency plan for when cybercrime strikes and take the proactive measures Boni suggests. Regularly print and save log files from critical servers. Establish a tamper-proof backup system to capture activity and audit trials.

Your policy should also include thresholds of what magnitude of loss or crime would trigger a call to law enforcement. Not all crimes should be reported for reasons of shareholder confidence and public image.

There are two schools of thought when it comes to actually handling the computers.



THE STOCK ILLUSTRATION SOURCE

Anderson advises his clients to leave the system running. Boni suggests shutting it down.

Warren Kruse, investigations manager for Lucent's computer and network security department in New Jersey, laughs when he hears those options.

"The golden rule of computer evidence is there are no golden rules," he says. "The person who tells you to keep the computer on worries about losing everything in RAM, which could contain valuable evidence in temporary files. The person who tells you to turn off the machine worries about hidden processes like timed viruses destroying the hard drive."

Lucent's seven-person computer and network security department works like a security help desk for the vendor's 136,000 employees. When users report suspect activity on their machines, team members are dispatched to investigate.

Don't count on your audit manager or administrator to know the correct methodology for preserving evidence. In a recent court case, the defense retained PriceWaterhouseCoopers' forensics experts because the victim had badly damaged the evidence.

The aggrieved firm's management told IS to get proof that an employee had misappropriated intellectual property. "IS copied e-mail and log files but didn't create forensics copies — a bit-stream backup of the hard drive of the laptop, desktop and e-mail server," Boni says. "We had to tell the court that their copies were totally inadequate."

Forensics backups take a mirror image of the hard drive, grabbing all of the file slack and erased space — which traditional backups miss — as well as named files. This ambient data is often the smoking gun in cybercrime prosecutions, Anderson says. He suggests using Sydex, Inc.'s SafeBack to perform mirror-image backups.

The method of attack is another factor that determines what action you should take. If the crime stems from inside the network, Boni recommends suspending all access to the affected server or database until law enforcement can make evidentiary copies of relevant files.

"There's evidence in the database log, activity records or the operating system that could be affected by automated backup jobs or other routine activities," he says.

For external attacks launched from the Internet, start by printing an evidentiary copy of firewall logs. Then see what evidence you can gather from your firm's ISP — perhaps the ISP could freeze records or provide additional logs and auditing. However, Boni says most ISPs aren't too helpful because they put the burden of security on their clients.

Finally, know when you're in over your head, Lucent's Kruse says. If there's any question, call in the big guns: either a cyberforensics expert or law enforcement.

Cyberforensics consultants from the computer security divisions of the Big Five accounting firms charge upwards of $2,500 per day for their services. One alternative is to teach an IT staffer or a team of auditing, security and legal workers the appropriate methodology for handling computer evidence. NTI offers a three-day training course for $2,000, including software.

Most large metropolitan police forces and federal agencies have well-trained cybercops among their rank and file.

If your company does go to the authorities, be prepared to allocate a lot of time and resources to work with the police, Boni says. Above all, he says, "if evidence is in the machine, leave it in the state it's in."

Radcliff is a freelance writer in Northern Calif. She can be reached at DeRad@aol.com.

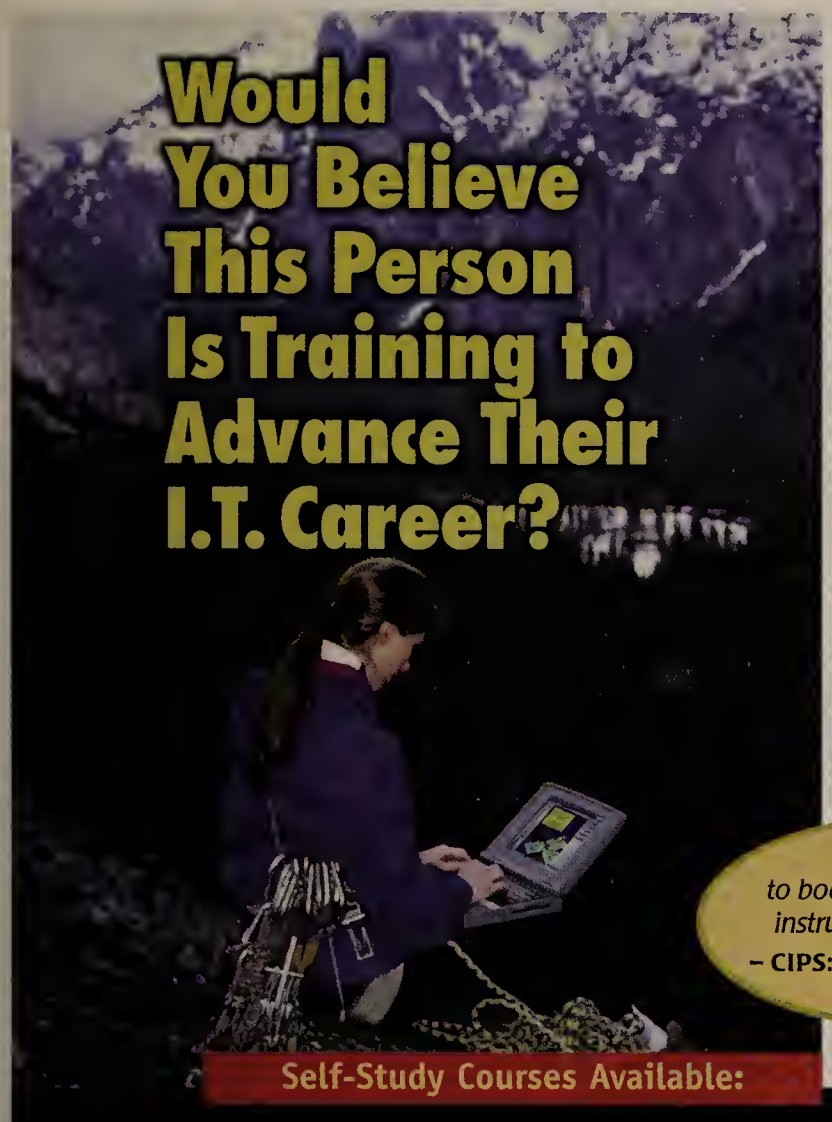
HOT TIPS

Michael Anderson, founder of cyberforensics training and consulting firm New Technologies, offers this advice for handling computer evidence:

- Don't run the computer without performing a mirror image backup first.
- Don't ask for help from the computer owner.
- Check for computer viruses.
- Be careful when you transport computers.

Get more online:

- Information about preserving the evidence of cybercrime.



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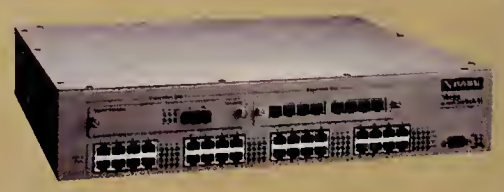

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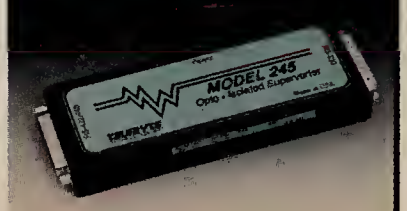

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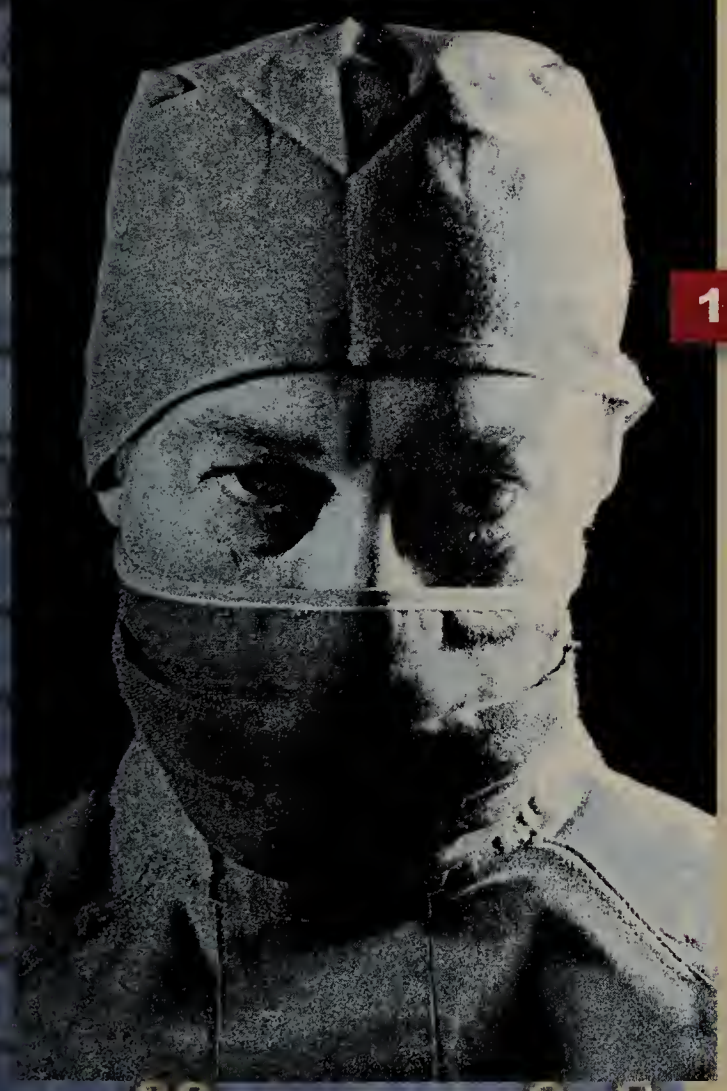

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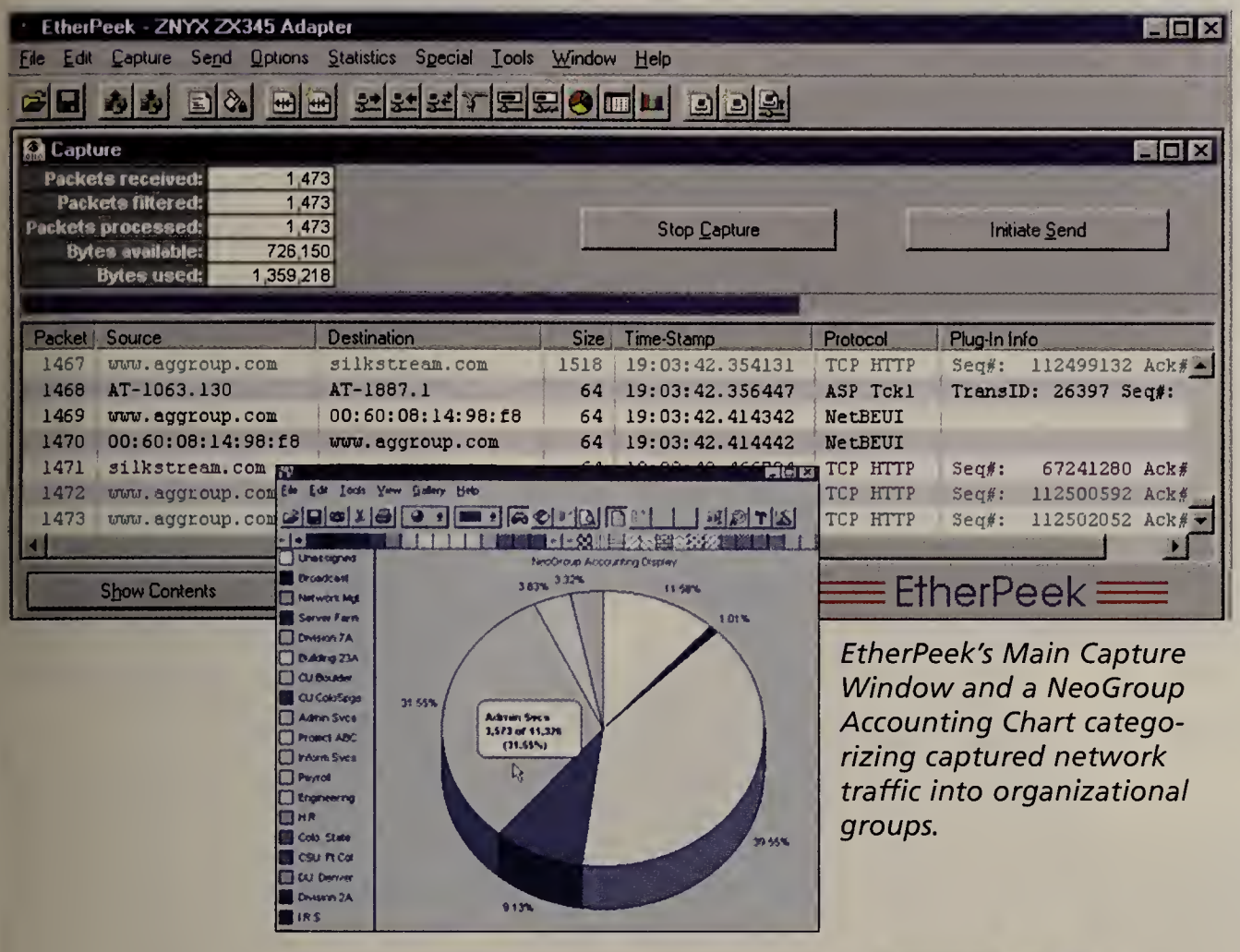

EtherPeek's Main Capture Window and a NeoGroup Accounting Chart categorizing captured network traffic into organizational groups.

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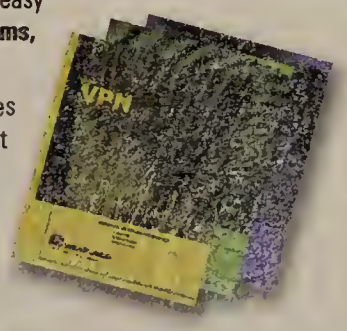

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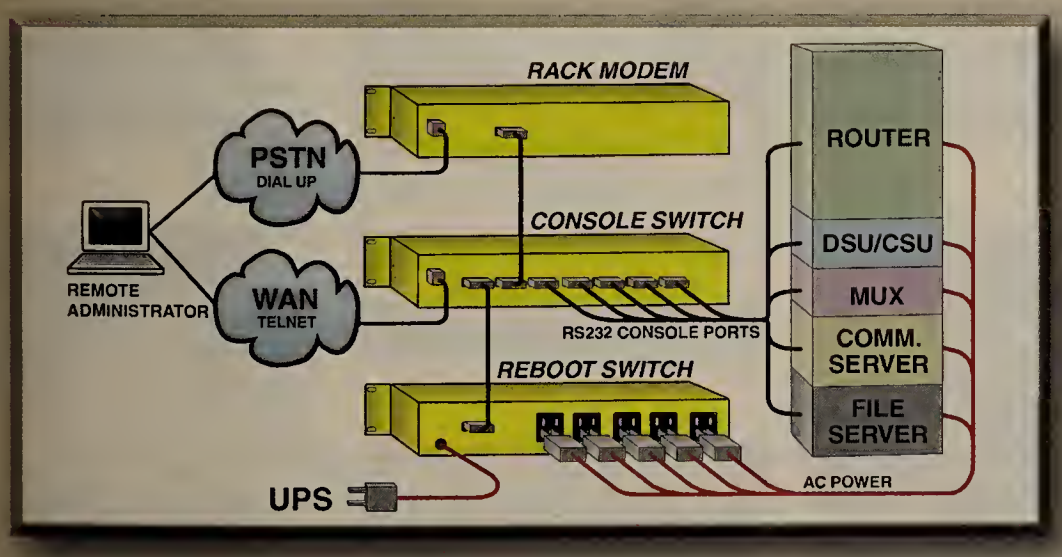

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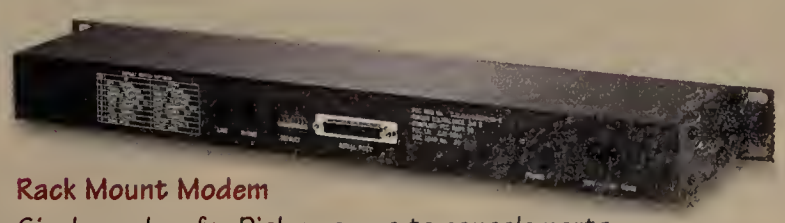

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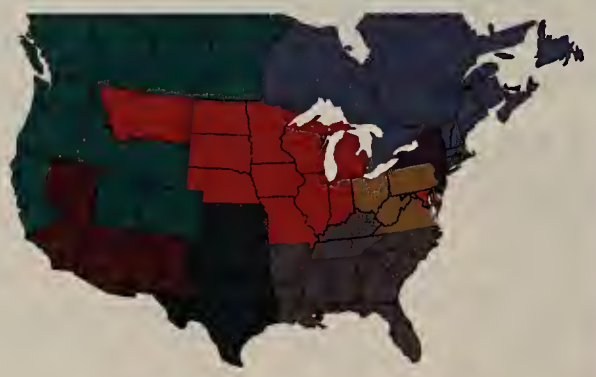

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DIRECTORY OF SERVICES

HotJava

Continued from page 1

about features but did say the update will give corporations a worthy alternative to Microsoft's Internet Explorer.

Recent surveys show that Microsoft has overtaken Netscape in the browser market, and many observers believe this lead will widen.

This is a major concern to Sun because Explorer is not fully Java compatible, which may scare potential customers away from the company's prized Java technology. For this reason, "Sun wants to make sure there's a good browser out there that runs Java," says Anne Thomas, senior consultant at the Patricia Seybold Group in Boston.

A Java browser was supposed to come from Netscape. In fact, Sun last year dropped plans to commercialize HotJava in large part because it was counting on Netscape to carry the Java flag onto the browser battlefield, with Netscape's Javagator project and in the continued support of Java in its Navigator and Communicator browsers.

Netscape in the summer of 1997 said Javagator, an all-Java browser based partly on HotJava code, would be on the market by the first quarter of this year.

However, as the company's financial and market share problems mounted, internal Java development, including work on Javagator, was put on the back burner.

Further, while Netscape is an original member of the Java alliance, its support of Java has fallen behind in its updated browsers. Last November the company pulled the Java-compatible logo off of Communicator 4.04 because it did not support Java Development Kit 1.1. In fact, Netscape no longer actively develops a Java Virtual Machine.

While Sun never completely quit developing HotJava — it released Version 1.1.5 last December — the company long ago abandoned any pretense of challenging the Microsoft and Netscape browsers in the PC and desktop markets.

Instead, Sun has targeted the lightweight Java browser for OEMs and developers to bundle with their own Web-enabled devices and applications.

Asked if the upcoming version of HotJava will be designed to compete with Netscape and Microsoft in the commercial browser market, Ryder would only say, "The current product is not positioned that way."

Ryder says that if Explorer emerges as the dominant browser, Microsoft would have a competitive advantage in the Web consumer product and services markets.

"Because the browser market continues to solidify around Microsoft, companies that are in the solutions business or the content business face a serious risk," Ryder argues.

The reason, he says, is that Microsoft is configuring its browser to drive traffic to its own services. "As Microsoft expands its base into homes and cars and mortgages and financial services and everything else, [Web-based competitors] risk losing access to their customers," Ryder says.

"If you go into the search site in Explorer, the default is Microsoft's search engine, and the first results that come back are Microsoft sites," he says.

"So if you want to buy a new car, you'll get sent to CarPoint, which is Microsoft's site. And if you're Autoweb.com or Auto-by-Tel, that's a problem," he says. ■

Browsing for Java support

Are there any browsers that fully support Java applications? Not really. Here's where the major browser vendors stand on Java.

Microsoft Internet Explorer

Microsoft's browser doesn't fully support Sun's Java Development Kit (JDK) 1.1. Therefore, applications written using JDK 1.1 that run on MacOS, Unix and Netscape Navigator may or may not run on Explorer.

Netscape Navigator and Communicator

Netscape's browsers were supposed to support Java applications built using the latest JDKs, but the company has dropped its client-side Java development. The browsers still support Java applications developed with older JDKs.

Sun HotJava 1.1.5

Built completely in Java, HotJava is supposed to run all Java applications using Sun-approved development kits. However, the lightweight browser has proven to be slow and unable to handle Java-intensive Web pages. It was designed for a thin-client environment.

SAN

Continued from page 1

connected by Fibre Channel, that can be accessed, theoretically, by any server in the enterprise or any other storage device.

HP already offers some storage management applications, such as OmniBack, a management product for backing up and recovering Unix and Windows NT data. The company also sells OmniStorage, which automatically moves data to the storage media — optical, tape or disk — that has the most available space. But HP's new SAN management product will give IS managers a much more comprehensive application than what is already available, sources say.

"There will have to be some agreement on common application program interfaces and other means to control the storage infrastructure."

Craig Warren, *director of channel marketing, StorageTek*

While details of this week's announcement are sketchy, sources say HP is seeking to bring policy-based management to SANs.

As HP's strategy unfolds and more products come to market, users should be able to more easily control the SAN environment, sources say.

For instance, IS staff should be able to prioritize which users get preference in securing storage space for their data.

Among other benefits, users will be able to have a single image of an entire network, complete with the SAN attached to it. Staff will be able to determine SAN resources and the status of individual SAN devices.

Earlier this week, HP announced it would offer a Fibre Channel Hub Manager software product. Now, sources say, the company will be adding tools to manage Fibre Channel switches as well as a variety of storage devices, such as RAID towers.

In the future, users will have the ability, from a single OpenView console to enable and disable ports in a Fibre Channel switch, monitor the switch's temperature, fan and power supply, and discover which connections are inoperative. With HP software, IS managers will be able to add, configure or remove parts of the SAN without disrupting the entire network.

Users will also be able to set basic levels of service in the SAN and use tools such as Simple Network Management Protocol, so that if a storage device or disk is in danger of failing, an alarm will be triggered on the OpenView screen.

Also, users will be able to set thresholds for storage disks and could receive a warning when the disk is approaching its data saturation point.

The new SAN management applications will run with members of the existing OpenView product family, such as the Network Node Manager 6.0.

HP declined to comment on the rollout. Observers had mixed reactions on the pending announcement.

"HP is going in the direction that the industry is in terms of policy-based management," says Paul Edmunds, senior network analyst at Duke Power Co., based in Charlotte, N.C. "They recognize the importance of the storage system and managing it appropriately." Storage has become a greater concern in his network recently, as storage devices have to handle ever-greater loads of data.

"You have to pay attention to those networks and the demands placed on them," Edmunds added. Anything that gives a user visibility into a SAN will be a help, he said.

"This is certainly a step in the right direction, for HP to provide integrated services," says Rich Ptak, an analyst at D.H. Brown Associates in Amherst, N.H.

According to Craig Warren, director of channel marketing for StorageTek's Storage Networking Business in Minneapolis, "There will have to be some agreement on common application program interfaces and other means to control the storage infrastructure." This is because the SAN hardware has to respond to management commands to change configurations and modify the connections between servers and storage, he says.

"What good is it if they can control a hub and they can't control other switches or other vendors products?" he asks.

Also, sophisticated routing of data, such as policy-based management, will require intelligence in the SAN, Warren adds.

StorageTek is a competitor of HP in the SAN arena, and Storage Tek sells management software for its SAN products. Warren says that the company is willing to partner with HP and other vendors to advance the acceptance of SANs in the enterprise. ■

Frame relay

Continued from page 1

While frame relay took its lumps earlier this year in the wake of AT&T's big network outage, the technology is a staple of corporate networks and a platform for multimedia applications. Speaking at a Frame Relay Forum event, Gartner Group Research Director Jay Pultz predicted that the number of frame relay sites will reach one million next year.

Users at the conference said they're fascinated by the prospect of running voice over their frame relay WANs and intrigued by the possibility of integrating frame relay and IP networks.

However, users also said frame relay is becoming increasingly complex.

Frame relay meets the 'Net

MCI WorldCom's Frame Relay Internet Gateway service is designed to let current frame relay customers securely link their legacy networks to the Internet.

The company is equipping six of its frame relay switching centers across the U.S. with firewall servers/secure gateways from Check Point Software Technologies.

Frame relay customers will be able to map dedicated permanent virtual circuits (PVC) across their frame networks to connect to one or more secure MCI gateways. The gateways then directly connect to the Internet backbone of MCI WorldCom's UUNET subsidiary.

While users today dedicate PVCs to Internet access, no other service provider has offered this capability with security features such as 40- to 128-bit key encryption and user authentication. Such security is essential for users who have been using virtually private frame relay services until now.

"Security is absolutely required for us; we wouldn't even consider such a service without it," says Bob Galovic, managing director of information resources at the American Automobile Association, a Heathrow, Fla., company that has a nationwide frame relay network managed by AT&T.

AAA is interested in IP-based virtual private network (VPN) services, but moving in that direction today would require the company to reconstruct its entire WAN, Galovic says.

"A new network service that extends the life of our existing network is attractive," he says.

AT&T has not offered AAA such a service option, though Galovic says he hopes the carrier will soon. Galovic says he drew up a "list of things to talk to AT&T about" after he saw the MCI WorldCom service announcement.

But Galovic will be waiting longer than he may like for AT&T to take action. "We're not sure users are ready to give up the control of their firewalls yet," says Robert Marschall, product manager at AT&T WorldNet.

While AT&T is not saying it will never support this type of service, the company has no plans to do so today.

Like AT&T, Sprint allows its frame relay customers to map PVCs to its IP network. But Sprint also is not deploying "network firewalls," says Mike Fitz, the carrier's group manager of IP service product management.

"Firewall vendors don't have the technology that will allow service providers to support multiple users on a single device," Fitz says.

In fact, MCI WorldCom will be deploying separate Check Point Firewall-1 servers for each customer at the carrier's switching sites.

MCI WorldCom *made its presence felt last week on the Interop trade show floor.*

"What MCI WorldCom is doing is a step in the right direction because a large number of users realize that security is not their core expertise and wish to outsource their security needs," says Greg Howard, director at Infonetics Research, a consulting firm in San Jose, Calif.

"The problem MCI WorldCom will face is in scaling and managing all of those firewalls," Howard says. "It's extremely difficult to manage firewalls in the hundreds and thousands."

While Check Point's firewalls have been designed for enterprise networks rather than carrier networks, it makes sense that MCI WorldCom would choose the Check Point products initially.

UUNET is using these firewalls for its managed firewall service today, and its engineers will likely be the ones who will manage the gateways for the new MCI WorldCom service.

MCI WorldCom's Frame Relay Internet Gateway is available now, and comes with a hefty price. Users will pay $2,495 for 1.544M bit/sec worth of bandwidth to the Internet gateway.

If they want to use security features, users will pay an additional $4,000 per month. On the low end, if users only need 128K bit/sec worth of bandwidth to the gateway, they will pay $375 per month without any security options.

Equant gets into the act

Equant, the newly independent international packet network with roots in the airline industry, used the show to unveil iVAD, a service that allows users to place intra-enterprise phone calls over Equant's frame relay service.

With iVAD, which stands for Integrated Voice and Data, Equant swaps out the Cisco 2500 router it typically installs on the customer's premises, for a Cisco 3810 multiservice access device.

That product, introduced at the beginning of the year, adds PBX connectivity ports to a branch office router and packetizes the voice streams for shipment over a corporate WAN.

Intracompany phone calls are routed over the Equant global frame relay network for delivery to other enterprise sites, bypassing regular international tolls and even the international IP telephony charges of emerging carriers.

Users who employ iVAD have to make one other change: If they have one frame relay PVC running between any two given sites, they must install a second.

The original PVC is reserved for what the user deems as critical or latency-sensitive data applications that may need to take advantage of frame relay's bursting capability.

The other PVC is reserved for voice traffic and noncritical data, such as messaging or other traditional LAN-to-LAN applications.

"That way, bursting won't occur on the voice PVC," says Laurence Huntley, executive vice president of marketing for Equant. Huntley cautions that the voice piece of iVAD can't be bought separately; users must subscribe to Equant's full frame relay service, including router management.

Analysts gave iVAD a big thumbs up, noting that existing frame relay WANs can generally be reworked faster to handle multimedia applications than pure IP-based VPNs can.

"Equant is ahead of the curve on this one," says Jeffrey Kagan, president of Kagan Telecom Associates in Atlanta. "When phone companies talk about their plans for their network of the future, they are describing what Equant already has in place with its global voice/data network."

"Although voice over IP will probably become dominant in the longer term, voice over frame relay will offer many cost benefits now," says Graham Finnie, research director at The Yankee Group in the U.K.

The iVAD service is available now in 41 countries, though not in all 75 countries in which Equant offers global frame relay services.

Recognizing that many countries with government-supported carriers are sensitive about alternative voice services, Huntley says Equant took a conservative approach and is only terminating iVAD voice traffic in countries that authorize voice competitors.

However, that includes most of the countries that signed last year's World Trade Organization agreement on telecom competition, which took effect last January. The group includes all of Western Europe, many Pacific Rim countries and a smattering of Latin American countries.

Easier to manage

GTE's new frame relay offerings may not be as leading edge as the others announced last week, but the services should prove useful to current frame relay customers.

The carrier introduced a frame relay monitoring service that gathers performance data about virtual circuits using smart DSUs/CSUs from Visual Networks called analysis service elements (ACE).

The ACEs also record traffic patterns to help network managers better plan the size of each frame relay virtual circuit in their networks.

GTE calls the service FrameWatch, and announced it along with SiteWatch, a service under which the company will monitor and manage network gear, including routers, hubs and switches.

FrameWatch costs $60 per month per site, and SiteWatch costs $100 to $350 per device.

Later this year, GTE will use ACE elements in a service that can monitor the performance of hybrid frame relay/ATM networks.

The service will track the quality of connections between corporate network sites that are connected to the WAN via a frame relay service and larger sites connected to the WAN by an ATM service.

Prices have not yet been determined.

✆ MCI WorldCom: (800) 539-2000; Equant: (781) 221-7171; GTE: (800) 643-8399

Showdown

Continued from page 1

panel of industry observers: Esmeralda Silva, LAN analyst at International Data Corp. (IDC); Kevin Tolly, president of The Tolly Group; and Jim Duffy, *Network World* senior editor. The debate focused on the price, performance, throughput and feature set of this new class of internetworking product.

Cisco took the most heat for pricing. Layer 3 switches generally cost less than $700 per 100M bit/sec port, but Cisco's Catalyst 8500 can cost up to $2,000 per 100M bit/sec port, according to Cisco product literature.

When asked how Cisco can market the 8500 as a Layer 3 switch at that price, Vice President of Enterprise Marketing Jayshree Ullal replied, "I want to correct the fallacy that the 8500 costs $2,000 per port. Depending on configuration it can be as low as $1,000 to $1,200 per port. Second, I don't believe the 8500 is simply a Layer 3 switch with fast forwarding. It is, in fact, a wire-speed switch router with full Cisco IOS services, features and nonblocking capability, as well as the ability to add native ATM switching and metropolitan-area network interfaces. That, therefore, takes it well beyond a classical fast switch."

Ullal added that Cisco's Catalyst 5500 and 2926G switches can provide Layer 3 features at $500 to $600 per port.

But Cisco wasn't going to get off that easily.

Bernard Daines, founder of Packet Engines, asked Ullal how long Cisco can use its IOS software as a "hammer" to force customers to buy overpriced boxes that aren't wire speed.

Ullal replied, "IOS is really about providing consistent command-line interface and software features, be they quality of service, security, redundancy, high availability, diagnostics or debug capability. It's not meant to be an excuse for providing best-in-class products. We have to, as a company, provide best-of-breed products."

Cisco was also grilled on the positioning of its Layer 3 switches vis-à-vis its traditional software-based 7000 series routers, the highly profitable products that made Cisco the internetworking leader it is today. IDC's Silva asked, "Most of the panelists, including Cisco, I suspect, plan to add WAN access interfaces and multiprotocol support to their Layer 3 switches. Where do you sell the 7000, and where do you sell the Catalyst 8540?"

(Left to right) Extreme's Gordon Stitt, *Foundry's Bobby Johnson and Packet Engines' Bernard Daines on the firing line.*

The 8500 line is targeted at the core of campus networks, while the 7000's "sweet spot" is WAN aggregation with channelized T-1 and T-3 interfaces, as well as SNA and multiprotocol support, Ullal replied. Cisco will be adding "convenience" WAN support to the 8500, she said, but the company continues to position the products as complementary campus core and WAN aggregation offerings.

Ullal then took some jabs of her own. Of Cabletron, she asked how the company could endorse flattened topologies, then policy-based switching, and then Layer 3 switching for increasing network performance.

"How do you explain the contradictions of all three strategies, and how are you rationalizing all three?" Ullal asked.

"I don't see it as a contradiction at all," replied P.G. Menon, Cabletron vice president of marketing. "Unlike calling a Layer 3 switch a full-function router and charging a premium, what we want to do is provide the latest technology to our customers, right away, at prices that make sense."

Ullal then blasted Nortel for forcing users to undergo a hardware upgrade to get IPX support on Nortel's Accelar switches. "How do you expect a customer to have additional hardware at additional cost for an additional protocol," Ullal asked.

Nortel has a discount program for current Accelar customers who want to upgrade to IPX routing, said Basil Alwan, vice president of product management at Nortel. "I'm not sure if Cisco has installed Accelar yet, but if you do we could offer that program to you as well," Alwan quipped.

Vendors didn't save all of their digs for Cisco. Nortel challenged 3Com to a Layer 3 switch bake-off after claiming that 3Com's CoreBuilder 3500 can only forward 48% of traffic at wire speed on a gigabit link.

3Com was happy to oblige.

"I think we would have to have a system test," said 3Com's Mick Seaman, chief technology officer for the company's Large Enterprise Business Unit, jabbing at Alwan's focus on per-port, rather than aggregate-switch, performance.

The showdown was moderated by *Network World* Editor in Chief John Gallant. ■

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Reporter's notebook

Show features everything from suckers to runaway trains.

Here's a look at the lighter side of last week's NetWorld+Interop 98 show.

There's a sucker born . . .

Bins of lollipops, courtesy of UUNET, greeted attendees as they poured onto the trade show floor. More than one show-goer was heard to question the choice of lollipops, asking "What kind of suckers do they take us for anyway?"

. . . every minute

The answer to the above question was answered easily enough by watching the hoards of attendees who sat through painfully self-congratulatory vendor presentations all in the name of getting the chance to become a walking billboard by winning a hat or T-shirt. Of course, there were a few goodies worth trying to snag. Perhaps the hottest giveaway was an inflatable alien doll distributed by low-key exhibitor Fuji Film Computer Products. But it was hard to overlook Internet Devices' gold bar giveaway, too. The maker of the Fort Knox security product had a typically bored looking security guard protecting the prize.

Is it Bartel or Nortay?

In an effort to demonstrate that Nortel's Bay purchase is going swimmingly, the newly named Nortel Networks went to the trouble of having CEO John Roth and President Dave House share the stage during a keynote speech. But the recent coupling caused a bit of confusion for the team running the merged company's convention operations. What with two booths, flying the Nortel banner, meeting rooms on the show floor and outside the show floor, it's no wonder that public relations people were running around in circles trying to keep all their appointments straight. Let's hope the product rollout for the combined company goes a lot smoother.

I think I'll wait a couple months

Phobos provided a sneak peek at its unannounced Gigabit Ethernet card. The most interesting thing about the card is the company's price plan. The P1000 will be available in two weeks for $1,695, but will cost less than $1,000 by year-end. The reason? The company is replacing a chip set that costs more than $600 with one that costs $75.

What a drag

Gigabit Ethernet equipment maker Packet Engines rolled out its big train engine-shaped booth, perhaps for the last time. Now that the company is being bought by Alcatel, Packet Engines is thinking about ditching the train, which employees say is a hassle to drag around from show to show.

Eat, drink, sleep Lucent

Lucent Technologies was all over Interop, from a keynote by CEO Richard McGinn to huge banners and a packed press/analyst breakfast. But Lucent may have gone one step too far when it tried to corral the convention center's escalators.

On the first day of the show, Lucent lined the space between the up and down escalators with dozens of triangular cutouts taped to the surface with variations on its convergence marketing theme, such as "What's it going to take to revolutionize your network?" Problem was, the flimsy cutouts were only just wide enough to fit between the escalators' handrails. So as attendees rode the escalators, their fingers kept colliding with the Lucent marketing material. By early afternoon, some of the cutouts were so smashed they had fallen off or were hanging limply over the handrails.

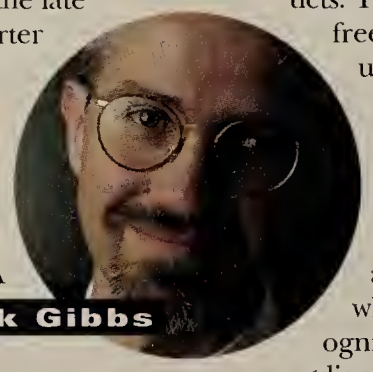
Backspin

A sermon on Linux: Part 1

Sing to the tune of *Anything Goes:*

In olden days most network vendors
Were looked on as real contenders
Now heaven knows, anything goes.
Some vendors who once had market share
Now haven't even got their hair
As they close, anything goes.

— Apologies to the late Cole Porter



Mark Gibbs

Brethren, welcome back to the First and Last Church of Networking. Let's have a round of applause for the choir. A fine job and, might I note, in tune for a change.

With all the present furor over Microsoft, Intel and Cisco and whether they have indulged in unfair competitive practices, now is a good time to reflect on the future of the network, the design of the desktop and the nature of the network operating system (NOS). It all comes down to operating systems.

So what have we got in the corporate world in the way of operating systems? Let's see, there's Windows, HP/UX, Windows, OS/2, Windows, OS/390, Windows, AIX, Windows, Macintosh, Windows, Solaris, Windows, IRIX and Windows. Oh, and there's the operating system that runs that cute little PalmPilot. And there's Windows. (Hey, editor, do you think I overdid that?) ((No more than usual — ed.))

Well, ladies and gentlemen, I'm here to tell you there is an alternative to consider, there is another choice, there is salvaaaation.

At one time, the joke was that no one got fired for buying IBM; now it is no one gets fired for buying Microsoft. And while I think the father, son and holy ghost of corporate networks —Windows 95, Windows 98 and Windows NT, respectively — have their merits, as I have said in previous sermons, they aren't the best or only solutions. Brothers and sisters, there is another way . . . the way of Linux.

Yes, this humble son of Unix is as a beacon in the darkness that is the lot of IT managers everywhere. ((Whoa, big guy, whoaaaa — ed.))

In the last few months, we've seen a surge of interest in open-source software (which includes Linux), and we're coming to understand this is a different way of thinking about products. The argument against freeware has been that it is unsupported and therefore unsupportable.

Now I think we can see that support from commercial vendors for any software generally is as good as it ever was . . . which is to say, hardly recognizable as support.

<digression>I recently received a very amusing account of one unidentified man's quest for support. He called Microsoft and listened for a considerable time to a technician learning the product! The technician failed to solve the caller's problem and Microsoft then added insult to injury by refusing to refund the $45 it charges per incident.

So by way of comparison, the chap with the problem called the Psychic Friends Network. They charge the same as Microsoft, are equally incapable of finding a solution but are far more polite. A lesson for us all, I think.</digression>

It really comes down to recognizing that the way support is really achieved for the majority of commercial products is by your own staff, using the product documentation, their insight, books, periodicals, news groups and Web sites. Now how do you support open-source products? Exactly the same way.

So why don't IT groups go for open-source products more? I have some ideas why and some ideas what they could do. So next week, brothers and sisters, we'll delve into the nascent Linux market and how it might have a fighting chance. Amen.

Throw something into the collection plate at nwcolumn@gibbs.com or on (800) 622-1108, Ext. 7504.

'Net Buzz

The latest on the Internet/intranet Industry

HARD HEART, BROKEN HEARTS News item: *"Is Oracle Chairman Larry Ellison the inspiration for the male character in a romance novel titled* A Hard-Hearted Man? *That's what inquiring minds want to know based on some tantalizing evidence linking the book's author, Melanie Craft of San Francisco, with the software magnate."— San Francisco Chronicle, Oct. 17.*

It was **NetWorld+Interop** again, and the Georgia World Congress Center was filled with the swollen expectations and turgid anticipation that only a network industry trade show can arouse. Outside, the sensuously lush Atlanta air hinted at sweet magic.

Attendees gently jostled for position in the heaving bosom of the auditorium, exchanging polite comments about the other suitors — **Lucent's Richard McGinn, Novell's Eric Schmidt, Nortel's John Roth.** Good, noble men all, their keynote speeches embraced the audience with a warm, inviting sincerity.

But Interop attendees didn't come to be politely and earnestly courted. They were there to be taken . . . by him.

Sure, he wasn't even scheduled to be there, but what did that mean? They knew he operated on animal instinct and unbridled impulse. One moment he could be in the Oriental garden of his Atherton, Calif., mansion, engaged in quiet contemplation over his impetuous prediction that network computers would take over the desktop. The next moment he could be strapped into the cockpit of his Marchetti S.211 jet fighter, soaring in a way that his ill-fated, thin-client strategy never did.

Chris Nerney

Some of the Interop attendees were lucky enough to be at **Internet World** two weeks before. There he was masterful, striding the stage like a Roman emperor, teasing them with visions of Oracle8i as his eyes brazenly caressed the audience from above his aquiline nose. Even from afar, they were intoxicated by the scent of his faint cologne — Eau de Relational Database, if they were not mistaken.

They admired his strong, golden fingers as he attempted to guide a balky iMac through a product demonstration. His forceful mastery of the recalcitrant machine left the audience taken aback, fearful of his steely determination, yet oddly and inescapably attracted to it. Is he this rough with all his partners?

In the end, Interop attendees would never find out, for there would be no rendezvous in the South, no denouement in Dixie. This hard-hearted man had callously snubbed them, disregarding their dreams, their desires, their birds-of-a-feather sessions.

It was a lesson hard-won, and attendees left Interop wiser if not sadder, liberated by their heartbreak and secure in the knowledge that, at long last, they were free from the reckless passion he inspired, the passion that enslaved and mocked them. They were free.

At least until **Comdex.**

I CAN'T STOP WRITING LIKE THIS **Dan Keshian** had a deep, burning ambition. As president and CEO of **WebLine Communications** in Burlington, Mass., Keshian wanted his start-up to be a leader in the Web-based customer call center software market.

Yet he knew he could not successfully assert his formidable will without some help. It was time to make an arrangement.

Striking a pact with a powerful group of financiers, Keshian recently landed an $8 million second round of venture funding for the 2-year-old company.

Among the group was a bold interloper, **Highland Capital Partners,** which joined original backers **Information Technology Ventures, Draper Fisher Jurvetson, Advent International** and **Advanced Technology Ventures,** they of an equally impressive $8 million first round of cash.

Keshian and WebLine will use the new funding to expand research and development, field operations and, no doubt, plundering.

Give in to the moment and send 'Net Buzz your most intimate, revealing and salacious Internet- and intranet-related news. Contact Chris Nerney at (508) 820-7451 or cnerney@nww.com.

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